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Tips
 Consumer Electronics



PC Audio:

How To Create, Edit & Record Music & Sound Effects Like A Pro, Part I p. 86



Consumer Electronics & COMPUTERS

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YOU

How To:

Choose The Right Cell Phone

Pick The Best Wireless Service

Send & Receive Text Messages

& More p. 56



June 2004
 Vol. 2 Iss. 6
 \$5.99 U.S.
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PLUS: TiVo Quick-Start Guide
 How To Set Up & Use Your New DVR p. 50



cowboy

lasso

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Windows® XP Professional
for Business.

IBM ThinkPad R51

Distinctive IBM Innovations:

- Access Connections – Easiest wired and wireless connectivity

System Features:

- Intel® Centrino™ Mobile Technology
 - Intel Pentium® M Processor 1500MHz
 - Intel PRO/Wireless Network Connection 802.11b/g
- Microsoft Windows XP Home Edition¹
- 14.1" XGA TFT display (1024x768)
- 128MB DDR SDRAM • 20GB hard drive
- Ultrabay® Enhanced CD-ROM
- IBM UltraNav™ – TrackPoint® and touch pad
- 1-yr system/battery limited warranty²

\$1,199* ■ Part Code 288726U-M220

ServicePac® Service Upgrade³
3-yr Depot Repair #80LS192-132

NEW! IBM ThinkPad X40

Distinctive IBM Innovations:

- Rapid Restore™ – Push-of-a-button data backup and recovery

System Features:

- Intel Centrino Mobile Technology
 - Intel Pentium M Processor ULV 1GHz
 - Intel PRO/Wireless Network Connection 802.11b
- Microsoft Windows XP Professional
- 12.1" XGA TFT Display (1024x768)
- 256MB DDR SDRAM • 20GB hard drive
- Integrated Gigabit Ethernet and modem
- Legendary IBM full-size keyboard⁴
- Only .94" thin⁵ • 2.7-lb travel weight⁶
- 1-yr system/battery limited warranty²

\$1,499 ■ Part Code 238612U-V020



Wireless IBM PCs give users the easiest wired and wireless connectivity. So you can rein in help desk calls. Yeehaa!

Outfit users with IBM ThinkPad® notebooks including Access Connections software and wireless Intel® Centrino™ Mobile Technology (select models), and you may experience something really wild: a quieter help desk. Because Access Connections helps users switch between wired and wireless settings at the drop of a hat. So whether you're working on upgrades, security enhancements or integration, you won't have to keep diverting resources to help users connect. Wireless IBM ThinkPad notebooks with Access Connections software. Welcome to the new wireless frontier. **think freedom**

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personal, family or household purposes. Service period begins with the equipment date of purchase. Service levels are response-time objectives and are not guarantees. If the machine problem turns out to be a Customer Replaceable Unit (CRU), IBM will express ship the part to you for quick replacement. On-site 24x7x2-hour service is not available in all locations. For ThinkPad notebooks requiring LCD or other component replacement, IBM may choose to perform service at the depot repair center. (H) Full-size keyboard: As defined by ISO/IEC 15412. (B) Shipping: Standard shipping included when you order online. U.S. only. (10) Travel Weight: Includes battery and optional travel bezel instead of standard optical drive in Ultrabay bay. If applicable, weight may vary due to vendor components, manufacturing process and options. Thinness: may vary at certain points on the system. Trademarks: The following are trademarks or registered trademarks of IBM Corporation: IBM, the IBM logo, ThinkPad, Ultrabay and UltraNav. Microsoft and Windows are registered trademarks of Microsoft Corporation. Intel, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Intel SpeedStep and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Other company, product and service names may be trademarks or service marks of other companies. ©2004 IBM Corporation. All rights reserved.

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Power. Security. Wireless. Talk about a roundup.



IBM ThinkPad® R51

Distinctive IBM Innovations:

- IBM Embedded Security Subsystem 2.0* – Strongest security as a standard feature

System Features:

- Intel® Centrino™ Mobile Technology
- Intel Pentium® M Processor 1.50GHz
- Intel PRO/Wireless Network Connection 802.11b/g
- Microsoft Windows XP Professional®
- 14.1" XGA TFT Display (1024x768)
- 256MB DDR SDRAM • 20GB* hard drive
- Integrated Ethernet and modem
- Ultrabay™ Enhanced CD-RW/DVD-ROM combo
- IBM UltraConnect™ Antenna for increased signal strength†
- 1-yr system/battery limited warranty**

\$1,299 NavCode 28832RU-M220

ServicePac® Service Upgrade:†
3-yr Depot Repair
#30L9192 *132

IBM ThinkPad® R51

Distinctive IBM Innovations:

- Rapid Restore™ – Push-of-a-button data backup and recovery

System Features:

- Intel Centrino Mobile Technology
- Intel Pentium M Processor 1.50GHz
- Intel PRO/Wireless Network Connection 802.11b/g
- Microsoft Windows XP Professional
- 15" SXGA+ TFT Display (1400x1050)
- 256MB DDR SDRAM • 40GB hard drive
- Integrated Ethernet and modem
- Ultrabay Enhanced CD-RW/DVD-ROM combo
- IBM UltraNav™ TrackPoint™ and touch pad
- 1-yr system/battery limited warranty**

\$1,499 NavCode 103603U-M220

IBM ThinkPad® T41

Distinctive IBM Innovations:

- Access IBM – IBM help at your fingertips
- IBM Active Protection System – Airbag technology to help protect your ThinkPad

System Features:

- Intel Centrino Mobile Technology
- Intel Pentium M Processor 1.40GHz
- Intel PRO/Wireless Network Connection 802.11b
- Microsoft Windows XP Professional
- 14.1" XGA TFT Display (1024x768)
- 256MB DDR SDRAM • 40GB hard drive
- Integrated Gigabit Ethernet and modem
- Ultrabay Slim CD-RW/DVD-ROM combo
- IBM UltraConnect Antenna for increased signal strength
- Only 1" thin • 4.5-lb travel weight†
- 1-yr system/battery limited warranty**

\$1,679 NavCode 23780HU-M220

With Microsoft Office Small Business Edition 2003:† \$1,919
ServicePac® Service Upgrade:
2-yr Onsite Repair/9x5/Next Business Day Response
#30L9189 *197

IBM ThinkPad® T41

Distinctive IBM Innovations:

- IBM Active Protection System – Airbag technology to help protect your ThinkPad

System Features:

- Intel Centrino Mobile Technology
- Intel Pentium M Processor 1.60GHz
- Intel PRO/Wireless Network Connection 802.11b
- Microsoft Windows XP Professional
- 14.1" SXGA+ TFT Display (1400x1050)
- 256MB DDR SDRAM • 40GB hard drive
- Ultrabay Slim CD-RW/DVD-ROM combo
- Integrated Gigabit Ethernet and modem
- IBM UltraConnect Antenna for increased signal strength
- Only 1" thin • 4.5-lb travel weight
- 3-yr system/1-yr battery limited warranty**

\$1,939 NavCode 75/76U1U-M220

With Microsoft Office Small Business Edition 2003: \$2,179
ServicePac® Service Upgrade:
5-yr Onsite Repair/9x5/Next Business Day Response
#69P9200 *449

NEW! IBM ThinkPad® X40

Distinctive IBM Innovations:

- Rapid Restore – Push-of-a-button data backup and recovery
- IBM Active Protection System – Airbag technology to help protect your ThinkPad

System Features:

- Intel Centrino Mobile Technology
- Intel Pentium M Processor ULV 1GHz
- Intel PRO/Wireless Network Connection 802.11b
- Microsoft Windows XP Professional
- 12.1" XGA TFT Display (1024x768)
- 256MB DDR SDRAM
- 20GB hard drive
- Integrated Gigabit Ethernet and modem
- Legendary IBM full-size keyboard†
- Only .94" thin
- 2.7-lb travel weight
- 1-yr system/battery limited warranty**

\$1,499 NavCode 23861CU-M220

ServicePac® Service Upgrade:
3-yr Depot Repair
#30L9192 *132

NEW! IBM ThinkPad® X40

Distinctive IBM Innovations:

- Longest standard battery life of any leading brand notebook†

System Features:

- Intel Centrino Mobile Technology
- Intel Pentium M Processor LV 1.20GHz
- Intel PRO/Wireless Network Connection 802.11b
- Microsoft Windows XP Professional
- 12.1" XGA TFT Display (1024x768)
- Intel Extreme Graphics
- 256MB DDR SDRAM
- 40GB hard drive
- Integrated Gigabit Ethernet and modem
- Legendary IBM full-size keyboard
- 7.5-hr Li-Ion battery†
- 3.2-lb travel weight
- 1-yr system/battery limited warranty**

\$1,749 NavCode 23866GU-M220

ServicePac® Service Upgrade:
4-yr Depot Repair
#69P9195 *249

NEW! IBM ThinkPad® X40 Solution Pack

Distinctive IBM Innovations:

- Access Connections – Easiest wired and wireless connectivity
- NEW! IBM Rescue and Recovery™ with Rapid Restore: One-button recovery and restore solution

System Features:

- Intel Centrino Mobile Technology
- Intel Pentium M Processor ULV 1GHz
- Intel PRO/Wireless Network Connection 802.11b
- Microsoft Windows XP Professional
- 12.1" XGA TFT Display (1024x768)
- 256MB DDR SDRAM
- 20GB hard drive
- 2.7-lb travel weight
- 1-yr system/battery limited warranty**

Accessories Included:

- ThinkPad X40 UltraBase Dock
- Ultrabay Slim CD-RW/DVD-ROM combo

\$1,799 NavCode 23881ZU-M220

ServicePac® Service Upgrade:
3-yr Onsite Repair/9x5/Next Business Day Response
#30L9195 *243

NEW! IBM ThinkPad® X40 Solution Pack

Distinctive IBM Innovations:

- Longest standard battery life of any leading brand notebook

System Features:

- Intel Centrino Mobile Technology
- Intel Pentium M Processor LV 1.20GHz
- Intel PRO/Wireless Network Connection 802.11b
- Microsoft Windows XP Professional
- 12.1" XGA TFT Display (1024x768)
- 256MB DDR SDRAM
- 40GB hard drive
- Integrated Gigabit Ethernet and modem
- 7.5-hr Li-Ion battery
- 3-yr system/1-yr battery limited warranty**

Accessories Included:

- ThinkPad X40 UltraBase Dock
- Ultrabay Slim CD-RW/DVD-ROM combo

\$2,199 NavCode 23868GU-M220

ServicePac® Service Upgrade:
4-yr Onsite Repair/9x5/Next Business Day Response
#69P9198 *299

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(Monitor not included)



(Monitor not included)



(Monitor not included)

IBM ThinkCentre™ A50p

Distinctive IBM Innovations:

- Rapid Restore Ultra – Push-of-a-button data backup and recovery

System Features:

- Intel® Pentium® 4 Processor with HT Technology 2.80GHz
- Microsoft Windows XP Professional
- 256MB DDR SDRAM
- 40GB hard drive • CD-RW
- Integrated 10/100 Ethernet
- Norton AntiVirus™ (2003 OEM Edition)
- Lotus® SmartSuite® Millennium license
- 1-yr limited warranty with limited onsite service**

\$789

NavCode 843338U-M220

With Microsoft Office Small Business Edition 2003: \$1,029

ServicePac® Service Upgrade:
2-yr Onsite Repair/9x5/Next Business Day Response
#54P1859 *75

IBM ThinkCentre A50p

Distinctive IBM Innovations:

- Rapid Restore Ultra – Push-of-a-button data backup and recovery

System Features:

- Intel Pentium 4 Processor with HT Technology 2.80GHz
- Microsoft Windows XP Professional
- 256MB DDR SDRAM
- 40GB hard drive • CD-RW
- Intel Extreme Graphics 2
- Integrated 10/100 Ethernet
- Norton AntiVirus (2003 OEM Edition)
- Lotus SmartSuite Millennium license
- 3-yr parts/1-yr limited onsite service limited warranty**

\$859

NavCode 843338U-M220

With Microsoft Office Small Business Edition 2003: \$1,099

ServicePac® Service Upgrade:
3-yr Onsite Repair/9x5/4-hr Response
#41L2732 *229

IBM ThinkCentre M50

Distinctive IBM Innovations:

- Rapid Restore Ultra – Push-of-a-button data backup and recovery

System Features:

- Intel Pentium 4 Processor with HT Technology 3.06GHz
- Microsoft Windows XP Professional
- 512MB DDR SDRAM
- 40GB hard drive • CD-ROM
- Integrated 10/100 Ethernet
- Lotus SmartSuite Millennium license
- 3-yr limited warranty with limited onsite service**

\$1,029

NavCode 8189F1U-M220

With Microsoft Office Small Business Edition 2003: \$1,289

ServicePac® Service Upgrade:
4-yr Onsite Repair/9x5/Next Business Day Response
#60P9161 *89

IBM ThinkCentre M50

Distinctive IBM Innovations:

- Rapid Restore Ultra – Push-of-a-button data backup and recovery
- IBM Embedded Security Subsystem 2.0 – Strongest security as a standard feature

System Features:

- Intel Pentium 4 Processor with HT Technology 3.0GHz
- Microsoft Windows XP Professional
- 512MB DDR SDRAM
- 40GB hard drive • DVD-ROM
- Durable all-steel chassis
- Toolless cover removal
- Gigabit Ethernet-integrated
- Lotus SmartSuite Millennium license
- 3-yr limited warranty with limited onsite service**

\$1,069

NavCode 8187F4U-M220

With Microsoft Office Small Business Edition 2003: \$1,309

ServicePac® Service Upgrade:
3-yr Onsite Repair/24x7/4-hr Response
#41L2740 *189

IBM ThinkCentre S50

Distinctive IBM Innovations:

- The smallest IBM desktop without compromise: 62% smaller than a standard IBM desktop
- Rapid Restore Ultra – Push-of-a-button data backup and recovery

System Features:

- Intel Pentium 4 Processor with HT Technology 3.06GHz
- Microsoft Windows XP Professional
- 256MB DDR SDRAM
- 40GB hard drive • CD-ROM
- Integrated 10/100 Ethernet
- 3-yr limited warranty with limited onsite service**

\$999

NavCode 818846U-M220

With Microsoft Office Small Business Edition 2003: \$1,239

ServicePac® Service Upgrade:
4-yr Onsite/9x5/4-hr Response
#60P9162 *250

IBM ThinkCentre S50

Distinctive IBM Innovations:

- Rapid Restore Ultra – Push-of-a-button data backup and recovery
- IBM Embedded Security Subsystem 2.0 – Strongest security as a standard feature

System Features:

- Intel Pentium 4 Processor with HT Technology 3.0GHz
- Microsoft Windows XP Professional
- 512MB DDR SDRAM
- 40GB hard drive • DVD-ROM
- Durable all-steel chassis
- Toolless cover removal
- Gigabit Ethernet-integrated
- 3-yr limited warranty with limited onsite service**

\$1,119

NavCode 818343U-M220

With Microsoft Office Small Business Edition 2003: \$1,359

ServicePac® Service Upgrade:
3-yr Onsite/9x5/4-hr Response
#41L2734 *129

IBM recommends Microsoft® Windows® XP Professional for Business.

IBM Think Express Program

Select and purchase IBM Think Express products, designed and priced for small and medium businesses.

IBM ThinkPad Accessories

Belkin Components Universal Notebook Travel Surge Protector
#22P7127 *10.00

Targus Deluxe Mobile Essentials Kit

#22P7437 *50

ThinkPad Premiere Leather Carrying Case®

#10K0209 *99

ThinkPad 72W AC/DC Combo Adapter

#22P9010 *99

ThinkPad Port Replicator II

#74P6733 *179

IBM ThinkCentre Accessories

128MB USB 2.0 High-Speed Memory Key

#22P9229 *59

Lexmark X6170 All-in-One

#22P9147 *200

17" (16" vis) E74 CRT Monitor

with system purchase

#W9SP4HN *129



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Open

GET THE LATEST CONSUMER ELECTRONICS NEWS, take a look at the newest round of products from several manufacturers, and catch a glimpse of high-end products most of us can only drool over. Also, check out Sascha Segan's column, in which he discusses the social ramifications of the camera phone craze, and head to page 20 for 15 straightforward tips on working with digital music.

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Be All That You Can USB
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Digital Music Files

Reviews

THIS MONTH OUR REVIEWS SECTION includes looks at a pair of satellite radio receivers, one for XM Satellite Radio and one for Sirius, which is appropos considering our side-by-side comparison of the two services on page 42. We also offer our take on a variety of home audio equipment, from wireless streaming devices to speakers and beyond. Also, check out our head-to-head review of several DVD/VCR combo players and reviews of three recent CE-related software packages.

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A/V Club

A/V CLUB IS PACKED TO THE GILLS this issue with a look at the current headphone market (including advice on what type of headphones are best for your needs), a face-off between XM Satellite Radio and Sirius, an up-close look at one of the most misunderstood audio components around (the equalizer), and a quick-start guide to getting your TiVo DVR up and running right Out Of The Box. Also, head to page 53 for a bit of commentary on A/V Club columnist Brian Hodge's latest CE purchase.

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Join The TiVo Nation

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From Here To
Infinity



Wireless Phones

AMERICA'S LOVE-HATE RELATIONSHIP WITH WIRELESS PHONES is an interesting facet of today's always-in-touch culture, but whether you love cell phones or hate them, you can hardly ignore them. If you're looking to upgrade to a new phone and/or plan, or if you're finally joining the rest of civilization and getting your first mobile, check out this section of the issue before you sign a service contract. We'll look at how various cell phone technologies work, what types of phones and phone features to insist on, and give you a quick rundown of what you can expect when you start shopping for service.



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- 67 Providers & Plans**
How Do Mobile Phone Plans Stack Up?
- 70 Up Next: 3G**
Multimedia Meets Your Cell Phone

Digital Studio

THIS MONTH OUR CONTINUING QUEST to arm consumers with better photography skills takes us to a subject near and dear to every shutterbug's heart: portraits. Let's face it, most of your pictures are probably of friends, loved ones, and large groups of each, so it's worthwhile to spend a few minutes on pointers to make those memorable shots better. We'll also take a look at what digital camera accessories you should consider when purchasing a new camera, and we'll explore what the latest small-format digital camcorders have to offer besides extreme portability.

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Shooting Better Portraits Takes More Than Saying "Cheese"
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Videos In The Palm Of Your Hand

CE @Home

CE @HOME KICKS OFF THIS MONTH with part one of a two-part clinic on creating and editing audio with your PC; this month we look at the hardware and software no audio workstation should be without. (Tune in next month for pointers on how to use them.) Find out about a growing segment of CE devices that can help you eat healthier, and take a look at the lighter side of PDAs—all work and no play, etc.

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Turn Your Computer Into An Audio Workstation
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PDAs Aren't Just For Business

Press Play

HEAD TO CE LITE for some great gift ideas or a fun gadget for yourself, then check out our reviews of some of the latest music, movies, and video games. We turn our Retroscope on that ubiquitous video warrior, the VCR, and check out page 112 for our CE Pick Of The Month.

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Beyond TV Is Right

Web-Only Articles

THERE'S SO MUCH GOING ON in the world of consumer electronics that it won't all fit in our magazine, so we're serving up a few extra *CE Tips* articles and reviews at www.cetips.com. If you're a *CE Tips* subscriber (or if you subscribe to *Smart Computing*, *PC Today*, or *Computer Power User*), head to the online table of contents for this issue, and you'll find links to each of the articles mentioned here.

- Extraterrestrial TV**
Satellite Television Has Come A Long Way
- Hardware Reviews:**
Harman Kardon SoundSticks II
DCR-IP1 MicroMV Handycam
Camcorder
Waves MAXX Home MiniWoofer
- DVD Movie Reviews:**
The Pink Panther Film Collection
Mona Lisa Smile

Editor's Note

Ah, summer. That magical time of year when coats and jackets vanish like the frost and the grill on the patio replaces the microwave as your favorite appliance. It's easy this time of year to put electronics and computing on the back burner as we head outside, blinking in the balmy sunshine. But this year the continuing emergence of affordable big-screen TVs and a host of electronics-related hardware and software products will likely keep CE fans ensconced in the cool, dim confines of our favorite rooms at least some of the time, enjoying our favorite movies, music, and games.

Because the almost frantic advance of electronics technology doesn't take a break to go waterskiing or camping, we'll be here all summer, keeping you abreast of the latest products and helping you wring every last drop of usefulness out of them.

To that end, we present the June issue of *CE Tips* magazine, in which we'll explore the latest trends in the world of wireless phones. Perhaps your current phone is getting a bit long in the tooth, and you've begun to covet your neighbors' snazzy new camera phones and/or PDA phones. Or maybe you're just now considering how nice it would be to be able to get in touch with your family and friends from wherever you are, without fussing with calling cards or pay phones, the latter of which are quickly becoming an endangered species. Either way, we have 16 pages of information on choosing and using the latest phones and calling plans from major wireless providers, so don't lock in that two-year service contract until you read this month's feature section, starting on page 56.

We've also put together a king-sized portion of new product news, reviews, and commentary, and you'll find some interesting discussions of new and improving technologies, including satellite radio (page 42) and tiny digital camcorders (page 82), that will make your time in the sun and on the vacation trail all the more memorable.

So whether you're off to travel the great North American highways and byways or are settling in for a summer of air-conditioned leisure, keep us close by and we'll make sure you know everything you need to know about the latest developments in audio, video, communications, and computing technology. Put an extra dog on the grill for us, and thanks for reading.



Chris Trumble, Publication Editor, *CE Tips*

Corrections

On page 22 of the May issue, we incorrectly listed the URL for Cambridge SoundWorks. The correct URL is www.cambridgesoundworks.com.



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Editorial Staff

editor@cetips.com
FAX: (402) 479-2104
131 W. Grand Drive
Lincoln, NE 68521

Advertising Staff

(800) 848-1478
120 W. Harvest Dr.
Lincoln, NE 68521
FAX: (402) 479-2193



CE News

COMPILED BY TRACY BAKER

Power Up Broadband Connections

Cable, phone, and satellite companies are no longer the only providers of broadband Internet access for home users, as Cinergy Broadband and Current Communications began delivering BPL (Broadband Over Powerline) service to Cincinnati, Ohio, in March 2004. The service provides an always-on Internet connection, much like cable modem and DSL (Digital Subscriber Line) technology used for most home broadband connections, and Cinergy claims speeds in excess of 3Mbps (megabits per second).

The technology uses existing power line wiring in homes to provide a home network. Users simply plug HomePlug modems into electrical outlets anywhere in the house to take advantage of the Internet connection and gain access to other computers and devices that also are connected via HomePlug.

The company plans to offer service in parts of Kentucky and Indiana in the near future, with a possible nationwide rollout under the name Cinergy Broadband at a later date. Currently plans for the 1Mbps service run \$29.95 per month, 2Mbps run \$34.95 per month, and 3Mbps for \$39.95 per month. ■

Garmin StreetPilot 2620 Heads In New Directions

GPS (Global Positioning System) equipment is becoming cheaper every year, but few products include route-planning capabilities. Garmin's new StreetPilot 2620 (\$1,516.65; www.garmin.com) generates turn-by-turn directions to practically any destination in the United States; it also lets you enter a series of destinations and plans routes from waypoint to waypoint, which is perfect for running errands or planning shopping expeditions. If there are particular roads or areas that you want to avoid, you can program the StreetPilot 2620 to eliminate them from consideration, and the integrated database helps you find the nearest gas stations, restaurants, and other points of interest that fall along your preplanned route.

Touchscreen technology is used to reduce the number of buttons you need to operate the device, and it displays 256 colors to better approximate a printed map. The unit comes with a remote control, and an external speaker outputs verbal instructions and warnings to help you keep your eyes on the road. The unit comes with a USB cable for connecting to a PC, but you don't necessarily have to buy Garmin's MapSource map database CD-ROMs because MapSource North American City Navigator maps are preinstalled to provide street-level data from coast to coast. ■



Samsung DuoCam Claims Mastery Over Still & Motion Pictures

It's an oft-lamented fact that digital cameras take decent still images but terrible video, while digital camcorders have the exact opposite strengths and weaknesses. Samsung originally tried to solve this dilemma with its DuoCam SCD5000 (see our review of the SCD5000 on page 26), which didn't quite live up to expectations; however, the company's new DuoCam VP-D6050i may serve well in both roles.

First shown in March at Europe's CeBIT 2004, the new DuoCam has a 5.25MP (megapixel) CCD (charge-coupled device) for snapping photos, and it switches to a separate 0.8MP CCD to record high-quality video. As a camera the device has a 3X optical and 12X digital zoom, while in video mode a different lens system bumps the optical zoom up to 10X.

You can store images on media, including Memory Stick, Memory Stick Pro, SD (Secure Digital) cards, or MultiMediaCards, and you record video to MiniDV tape, although it's possible to capture short MPEG-4 (Moving Picture Experts Group-4) video clips to memory cards using the digital camera. A 2.5-inch color LCD pops out from the side of the camera to serve as a swiveling viewfinder, and the DuoCam also incorporates a traditional color viewfinder that doesn't demand as much battery power as the LCD. Transfer images and video to a PC or Mac using either the integrated FireWire or USB interfaces. Pricing and expected availability were not available at press time. ■





Put Multimedia In Every Room With Sony's CAV-M1000ES

Multizone systems that deliver audio and video streams to several rooms in a home are becoming increasingly popular, and Sony's new CAV-M1000ES is about as full-featured as you might expect of products in the \$4,600 price range. The unit controls a variety of devices, including DVD players and CD players, cable boxes, and televisions, and its numerous connectivity options mean those devices don't have to be physically located anywhere near the CAV-M1000ES. You control the entire system with a \$400 master remote that uses RF (radio frequency) technology to work through walls and other obstacles and has a 5.1-inch color LCD touchscreen.

The CAV-M1000ES handles up to eight video and audio sources, provides pass-through capability for each source, and uses independent IR (infrared) remote control ports so you can control each source separately. The unit incorporates an amplifier that delivers 30 watts per channel to up to six zones and uses speaker wire and CAT 5 cabling to connect to each zone. Users in each zone can control content using small LCD keypads mounted on the wall. The CAV-M1000ES keeps track of CDs and DVDs loaded in attached components and delivers that information to the master remote and zone keypads so users can browse and select content for playback in their zone.

The system is only available through custom installers, and Sony maintains a list of dealers at its Consumer Integrated Systems Web site (www.sonyavdesigner.com). ■



Olympus C-60 Zoom Packs Big Resolution In A Small Camera

Olympus' new C-60 Zoom (\$499; www.olympusamerica.com) may be relatively small, measuring just 3.9 inches wide x 2.22 inches high x 1.6 inches deep, but it sports a 6.1MP sensor that captures images at resolutions high enough to allow for clear 11- x 14-inch printouts. It features all-glass lenses, has a 3X optical zoom and 4X digital zoom, and uses PictBridge technology so users can connect it directly to a PictBridge-compatible printer to make printouts without going through a PC.

Despite the camera's small size, it has numerous features that you usually find only in larger models. There are multiple flash settings, and you can set both aperture and shutter priority to capture sharp photos in many environments. The company's Dual Focus System, a feature formerly found only on Olympus' higher-end models, controls the focus. The camera also uses the company's TruePic TURBO image processor, a speedy chip that lets the camera process photos so you can quickly move on to the next shot. There are several preconfigured shooting modes available, including Landscape, Portrait, Self-Portrait, and Night Scene, and MyMode gives you fast access to your customized settings.

A 1.8-inch LCD on the back of the unit serves as a viewfinder and incorporates what Olympus calls "semi-transmissive" technology. Olympus claims this technology lets sunlight penetrate a few layers of the LCD instead of being reflected directly off the surface, reducing glare and improving the LCDs visibility in daylight. The camera comes with a 32MB xD-Picture Card and a USB 2.0 cable so you can connect to a PC. You don't need drivers when you use the device with most Windows computers because the systems recognize the camera as an external hard drive. ■

Browse From The Clouds

Forget about turning off all wireless devices on airline flights. Boeing's new Connexion service (www.connexionbyboeing.com) gives in-flight passengers access to 802.11b Wi-Fi wireless networking. The company has finally announced a pricing plan. Passengers on planes equipped with the technology can pay \$29.95 for unlimited access

for long-haul flights (more than six hours), \$19.95 for medium-haul flights (three to six hours), or \$14.95 for short hops that take three hours or less. The alternative is to opt for a metered account that has 30 minutes of access for \$9.95 and charges 25 cents for each additional minute.

The Connexion service sets itself apart from typical in-flight data services by offering broadband speeds. It'll be available initially on select transatlantic flights from airlines such as Ana, China Airlines, JAL, Lufthansa, Scandinavian Airlines, and Singapore Airlines. Boeing is also working with cellular providers so users with Internet-enabled mobile phones can use Connexion in the future. Service is not available during takeoff and landing, and it may cut out when the plane maneuvers. The service automatically stops billing customers under these circumstances until service is restored. ■

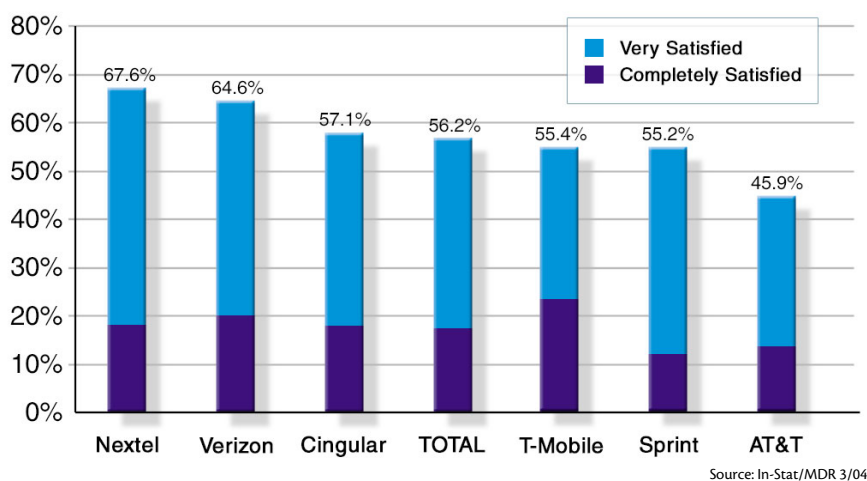


Consumer Electronics Marketplace

Wireless Insight

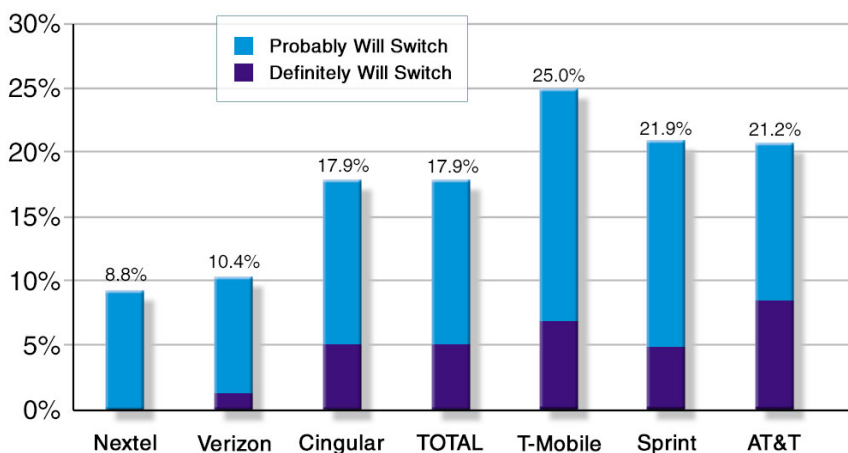
A recent InStat/MDR report indicates that Nextel is leading the pack in terms of customer satisfaction and that Nextel customers are very unlikely to **churn** (switch to a different provider). The report compared each wireless service in several categories, with Nextel and Verizon commanding several of the top spots.

Overall Satisfaction With Current Wireless Provider



Source: In-Stat/MDR 3/04

Wireless Consumer Likelihood To Switch Companies



Source: In-Stat/MDR 3/04

Tidbits

Apple's iTunes service has surpassed **50 million** downloads.

Source: Apple

Nokia launched **40 handsets** in 2003 and expects to release nearly that many by the end of 2004.

Source: Nokia

Panasonic recently introduced a **1GB SD memory card**—the highest capacity yet achieved for that memory media.

Source: Panasonic

Wal-Mart rolled out its Music Downloads site (musicdownloads.walmart.com), which undercuts the competition by charging **88 cents** per song.

Source: Wal-Mart

Microsoft has slashed the retail price of the Xbox by \$30, creating a new MSRP of **\$149.99** for the console.

The CEA (Consumer Electronics Association) predicts that digital television sales will climb to **5.7 million** units in 2004, **9.4 million** in 2005, **15.6 million** in 2006, and **23 million** in 2007.

Source: CEA

The release date for Sony's entry into the handheld gaming market, the **PSP** (PlayStation Portable), has been pushed back to 2005.

Source: Sony

A Look At The Latest Consumer Electronics

Summer's here, and the time is right. Whether you're shopping for home or the road, you'll find plenty of cool new gear on the shelves.

BY Gregory Anderson

AT&T Internet Call Alert

\$39.95

www.att.com

Dial-up Internet users know how annoying it is when Caller ID kicks you offline in the middle of a long movie download. AT&T's Internet Call Alert intercepts and records potential interruptions. Connect the device to the phone line and to each of your devices (PC, phone, fax) and then let Caller ID and Call Waiting do their thing. The unit beeps and lights up when a call comes in and stores the Caller ID history for later playback. It won't help your downloads move any faster, but at least you can control the interruptions.



Nikon Coolpix 8700

\$999.95

www.nikonusa.com

The battle of 8MP (megapixel) cameras is on. Nikon's Coolpix 8700, released in the spring, is small but loaded with features. The 8MP

CCD (charge-coupled device) produces prints up to 20 inches x 30 inches, and the Nikkor lens boasts an 8X optical zoom and 1.2-inch macro-shooting mode. The SLR (single-lens reflex)-type body weighs just 17 ounces and supports interchangeable accessory lenses. Store RAW (uncompressed graphics), TIFF (Tagged Image File Format), or JPEG (Joint Photographic Experts Group) files to CompactFlash cards, with bursts of up to five shots in two seconds. Let the games begin.



Open



Nokia 6820 Messaging Device

\$349.99

www.nokia.com

It isn't a phone. It's a "Messaging Device." Right. Marketing blather aside, Nokia's newest model truly is a multifunctional collection of technologies. From the now-requisite camera to built-in email tools, the 6820 suffers no shortage of ways to interact with the world. The flip-out QWERTY keyboard and rotating color display don't hurt either. The model is available on the AT&T network, which also carries voice calls.

Pentax Optio30 Digital Camera

\$199.95

www.pentaxusa.com

The Optio30 aims to simplify your photographic life. If all you need are good-quality, medium-sized snapshots for a reasonable price, Pentax has your camera. Its new Optio30 offers a 3.2MP sensor, a 3X optical zoom lens, and PictBridge technology for sending shots directly to compatible printers—all in a \$200 package. It doesn't get much simpler than that.



You knew something was missing in your life, but you just couldn't put your finger on it. Until now. Your nerd room won't be complete until you have a cool lighted keyboard from FireFly. The 104-key model, with 17 extra media keys, connects

via USB and is compatible with Windows Me and later. And don't worry about longevity: With a 20-year life expectancy, this keyboard will rock the party far longer than your new Alienware box.



FireFly Electroluminescent Keyboard

\$99.99

www.fireflyus.com



Open



Roku SoundBridge M2000

\$499.99

www.rokulabs.com

The SoundBridge M2000 network music player streams digital music files in about any format you can imagine from networked PCs or Macs to your home entertainment system. Just install the software (which includes native iTunes support) and connect the SoundBridge to your network (Ethernet or Wi-Fi) and to any audio system with analog or digital connections. Finally, use the M2000's 12-inch display to see what you're listening to.

Panasonic Viera TH-42PX25U/P Plasma Television

\$5,999.95

www.panasonic.com

Panasonic's new line of Viera flat-panel displays launched in the spring. The 42-inch high-definition plasma has a built-in ATSC (Advanced Television Systems Community) tuner (so you don't need a separate HD receiver) and a CableCARD slot to integrate and decode digital cable without a set-top box. It also sports PCMCIA (Personal Computer Memory Card International Association) and SD (Secure Digital) memory card connections for multimedia or network functions. The HD screen boasts a 3000:1 contrast ratio, 3/2 pulldown, and two-tuner picture-in-picture.





Open

Sony DCR-DVD201 DVD Camcorders

\$1099.99

www.sonymstyle.com

Sony is hedging its camcorder bets. Sony offers models in all of the main formats, including Mini DVD. The latest additions to the line are the DCR-DVD201 and DCR-DVD101 (\$999.99). Both record directly to 3-inch DVD-R/RWs, enabling automatic and immediate playback in most DVD players. The DCR-DVD201 includes a 1MP still-image sensor. Both models include USB 2.0 connections and editing software if you want to massage the footage from a PC before publishing.



Toshiba VM4050 Video Phone For Sprint

\$329.99

www.sprintpcs.com

If you don't have a camera phone, don't bother. They're so last summer. Check out the new breed of videophones, such as the VM4050 from Toshiba (available on the Sprint network). Use the Sprint Video Mail service (for a \$5 monthly fee) to capture and send video and audio clips to other video-phone users or use the included online storage to create a video archive of your travels.

Yamaha RX-V750 Home Theater Receiver

\$649.95

www.yamaha.com

Yamaha is famous for making high-quality, long-lasting receivers. Now it's breaking down price barriers. The new RX-V750 and its lower-powered sibling, the RX-V650 (\$549.95), are taking 7.1-channel Surround Sound to the masses, and they're bringing Yamaha's YPAO technology along with them. YPAO uses a microphone to automatically adjust the receiver's settings to a room's acoustics. How's that for listening to the market?



Shuffle

Camera Phone Nation

Smile—or don't.

Within two years, 80% of mobile phones will include cameras, according to research firm Gartner. And they won't be the little novelty models in today's phones: Phone cameras will pack up to 6MP (megapixels) by 2006, according to a Qualcomm executive speaking at a press conference in March.

The first print-quality camera phones are coming out this summer. Samsung, Motorola, LG, Kyocera, and others are all bringing out 1MP camera phones—good enough for decent 3-inch x 5-inch prints. And 2MP phones are already on the market in Japan.

Camera phones are different from other cameras for one reason: You have them with you all the time. Digital cameras, like film cameras, are generally brought out for special occasions, but your phone is part of your wardrobe. Suddenly, every moment can be captured.

The camera phone revolution is liberating, amazing, and creepy, all at the same time. Here's the liberating view: You can now share what you see everywhere you go. My wife and I got a matched pair of LG VX6000 camera phones at the beginning of this year, and we've been messaging frantically ever since. No cute store awning, no serendipitous trick of light goes unshared. The phones have brought us closer together in a way that plain voice communication doesn't; it's like being able to share a pair of eyes.

Nokia's new Lifeblog software is amazing. It automatically collects and collates all of your camera phone pictures, ordered by date and location, into a visual history of your life. Is your baby about to take her first steps? Don't run for the camera, reach into your pocket for the phone. In a camera phone nation, there is no such thing as a lost moment.

Maybe Lifeblog can also be the cure for the flaws of human memory. I certainly see the day coming soon when I snap a quick photo of everyone I meet to better match faces and names; with wireless, networked cameras, all we need is the software.

Camera phones have even stopped crimes. According to a March 19 Associated Press story, a flasher in Atlanta, a fondler in Japan, and a potential kidnapper in New Jersey were all stopped by the threat of instantaneous photography.

But here's the creepy side. Mobile phones, the industry loves to say, are all about empowerment. That's true. Sure, phone calls can interrupt romantic dinners or intense moments of concentration, but you still have the power to turn off your phone when you don't want to get any calls.

You have no power over other people's camera phones. In a camera phone nation, there is no privacy. Anyone may be taking a picture of you doing anything at any time. We are all potential paparazzi and potential victims.

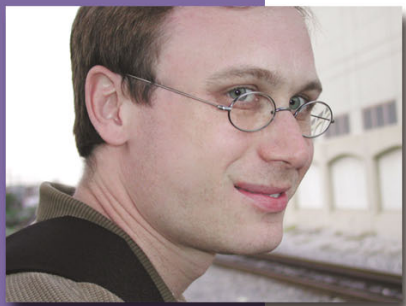
Sure, we already have wristwatch cams, binocular cams, and tiny digital cameras. But the numbers of those items pale before the prospect of 50 million camera phones. Wristwatch cams are fringe-geek toys; camera phones are a mass movement.

Fortunately, society is starting to think about the privacy issues involved with camera phones. Chicago, Newark, and the state of Florida are among the jurisdictions updating voyeurism laws to make it illegal to take pictures of people where they have a reasonable expectation of privacy. And a British company, Iceberg Systems, is offering up software that would disable phones' camera functions in sensitive places such as dressing rooms.

As a private individual, I should be able to say "No" to any non-newsworthy picture of me taken without my consent, especially if it's then published for all to see. And penalties should be harsh.

Focused, thoughtful responses beat knee-jerk bans of technology any day. The positive uses of camera phones are too many for the negative uses to send us running in fear, but we must face those negative aspects head-on and nimbly.

Camera phones themselves aren't a problem or a threat. They are a change, and a big change, in the way society works and in the power we have to capture our moments (and the moments of others). Let's react with thoughtfulness, not fear, to this new society, and let's not be afraid to set boundaries where we need to. 



COMMENTARY BY
SASCHA SEGAN



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High-end consumer electronics is all about differentiation. Sure, you already have a DVD player, but there's a better one out there. Here are some high-end products that stand out from their consumer-level cousins.

COMPILED BY GREGORY ANDERSON



JBL A3000GTi Amplifier

\$4,600 • www.jbl.com

Talk about horsepower. The A3000GTi car amplifier is powerful: 1,670 watts (rms [root mean square]) to two channels (at four ohms) or 3,129 watts (rms) to one channel (at four ohms). It's versatile: You can bridge the two channels, connect them in parallel, or deliver full-range audio. And it's good-looking: Indicator controls and internal lighting make JBL's flagship easy to use and attractive. But can your MINI handle it?

Kodak DCS Pro SLR/n

\$5,000 • www.kodak.com

The DCS Pro SLR/n sits at the head of the class. This digital SLR (single-lens reflex) turns in photos from a 14MP (megapixel) CMOS (complementary metal-oxide semiconductor) sensor. That's the highest resolution currently available in a digital SLR, if you're taking notes. It also has the widest selectable ISO (International Organization for Standards) range (from 6 to 1,600) of any digital SLR. The full-frame sensor provides 1:1 focal length magnification, so all lenses are film-equivalent. If you can just get everyone to sit still for a portrait, you'll be all set.



AMX Max Multimedia Server

\$7,400 (125 disc) to \$40,900 (900 disc)

www.amx.com



Some media servers do little more than stream MP3s from your PC to your stereo. The Max MMS, on the other hand, frees you from the chores of disc changing and delivers all of your CDs and DVDs at the touch of a button. It stores discs of both types in their native formats, so there's no loss of quality. Add MAX units to create multiple AV zones, from which you can cue discs simultaneously. AMX's software searches by genre, title, and other categories, and all disc menu options and scene information remains intact. And with capacities from 1.2 terabytes (125 DVDs) to 7.2 terabytes (900 DVDs), MAX has even the largest DVD collection covered.

Onkyo DV-SP1000 Universal Disc Player

\$2,000 • www.onkyousa.com

Smarter than the average DVD player, the DV-SP1000 includes a **video scaler** (delivers signals in several high-definition resolutions) and **3:2 pulldown** (improves picture quality of film-based source material). It also has digital video outputs, including FireWire and HDMI (High Definition Multimedia Interface). On the sound side, Onkyo's flagship player supports DVD-Audio and SACD (Super Audio CD) and is THX-Ultra certified. It even has two component outputs, one for each of your plasma displays.



Yamaha DPX-1100 DLP Digital Cinema Projector

\$12,495 • www.yamaha.com

To give your local cinemplex a run for its money, you need a front-projection display, and DLP (Digital Light Processing) digital projectors are at the forefront of projection technology. DLP uses hundreds of thousands of tiny mirrors, each with its own hinges and motors, to produce stunningly sharp and bright images. The DPX-1100 offers 1,280 x 720 native resolution in a widescreen 16:9 format (with a 4,000:1 contrast ratio). The latest model is also packed with image-enhancing Yamaha technologies (Natural Black for enhanced black reproduction; Optical Iris for heightened contrast), the latest Texas Instruments DLPi (Directional Correlational De-interlacing) technology from Faroudja (preventing jagged edges in moving images). About the only thing it won't do is pull the popcorn out of the microwave before it burns.





GADGET

Envy

Be All That You Can USB

Compiled by Sascha Segan

USB doesn't stand for "Unique, Strange, and Bizarre," but you'd never know it from these foreign gadgets. The inspiration for the wild creativity we found this month is the Universal Serial Bus ports found on all computers nowadays—and

specifically, the fact that you can use those ports like wall sockets to power small devices.

We had to seriously thin the pack before deciding on seven gadgets from overseas to display here. That means the USB

Christmas tree with flashing lights had to go; ditto the USB "aroma pot," which melts essential oils to soothe the mind. The items below, on the other hand, we actually want; it's a pity they're only available by special order from abroad.



USB-humid

The Japanese have a slew of ways to use USB to make workspaces a little friendlier. From Japanese manufacturer E-Lets comes this USB-powered humidifier and ionizer. The friendly little gadget sprays 30 milliliters of mist per hour into the air, helping you breathe easy in bone-dry hotel rooms and during long winters. At only 7 ounces and 5 inches high, it's portable enough to take on a train or plane, but we wonder what airport security would think. It's available from amazon.co.jp for ¥10,377 (approximately \$97).

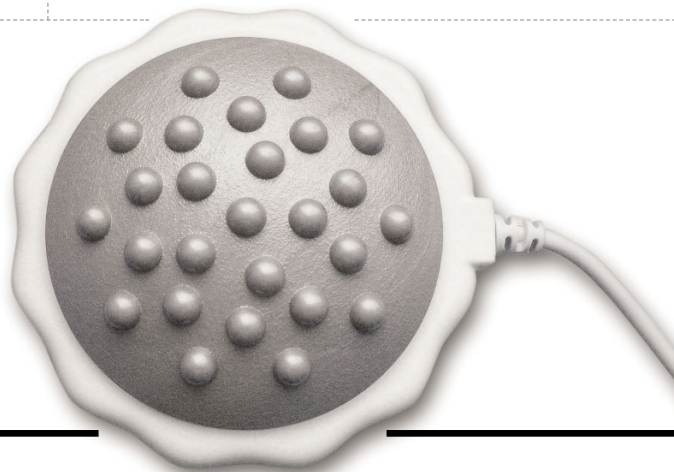


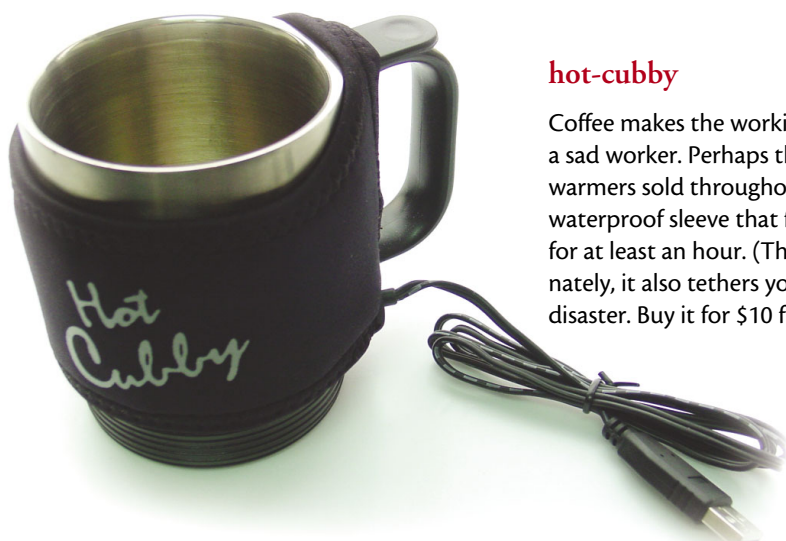
USB-ionizer

A simpler way to clear the air comes from Japanese manufacturer LOAS' UA-011 air ionizer; it doesn't actually scrub your workspace, but it kills offending odors by dosing the air with negative ions. It's especially good for tobacco and pet smells, according to the manufacturer, and at a mere 2.3 ounces, you really can take it anywhere (say, to that hotel that only has smoking rooms). Other manufacturers offer similar items in pink, as well as USB ashtrays that use fans and filters to suck the smoke out of your guttering cigarette. Amazon.co.jp sells the ionizer for a very affordable ¥923 (roughly \$9).

Buzzball2

Computing is stressful. Staring at a screen all day strains your eyes, and sitting in a chair all day makes your shoulders tense. Europeans loosen up with the Macally BuzzBall (€12, about \$15; from www.macally-europe.com), a USB-powered massager that vibrates a rubber pad at 3,600rpm to bring deep comfort to aching muscles. It's a cute, harmless-looking thing, too. Keep it plugged into the side of your keyboard and let it rest on your shoulders when you're bored, bringing you the relaxation you deserve.





hot-cubby

Coffee makes the working world go round, and a cold cup of coffee makes for a sad worker. Perhaps that's why we found at least *five* USB-powered cup warmers sold throughout Asia under different names. This one comes in a waterproof sleeve that fits around your coffee cup, keeping your drink toasty for at least an hour. (The heat element isn't hot enough to burn you.) Unfortunately, it also tethers your coffee to your keyboard and USB hub, which tempts disaster. Buy it for \$10 from Hong Kong retailer usb.brandoo.com.hk.

JM-4424

The use of a USB-powered alarm clock may appear obscure at first, but think of it as a gadget for road warriors visiting hotels with questionable clockery. USB isn't just an absurd method of powering this gadget; it also lets you download 50-second MP3 clips to wake up to.



Taiwanese manufacturer My-Space (www.myspace.com.tw) provides dozens of sample clips, including a telephone ringing to "It's A Small World After All." Various Japanese retailers sell the JM-4424 alarm clock for ¥3,980 (\$37).



USB-vacuum

Speaking of spills, LOAS' UA-009 USB-powered vacuum cleaner is just the sucker you need for cat hair, pistachio shells, dust, and the other nasty detritus that collects around your PC. Low and high power modes help extract everything you dropped into your keyboard while you weren't paying attention. The tiny little thing isn't a wet/dry vac, though, so you're on your own with the coffee spills. Pity it's not available in the United States, but you can order it from amazon.co.jp for ¥923.

MS-2680

We had to throw in one completely off-the-wall item, and when My-Space told us about its hippo speakers, we were dumbfounded. Sure, USB speakers are a dime a dozen. But how many of them look like giant, open-mouthed hippos? They bellow with a terrifying 100W, too, creating "deep bass without a subwoofer." Alas, we couldn't test them because we couldn't find them at retail anywhere, but you can check them out on www.myspace.com.tw.





15 Tips On . . . Working With Digital Music Files

1 Greater Volume Consistency

If you're constantly adjusting the volume on your car stereo, try normalizing. Rip the tracks from the CD to your computer and load them into an audio-editing tool (you can find some good freebies on the Web). Find the Normalize command on the menu and wait for the editor to complete its work. Use Save As to give the track a new name to distinguish it from the original track and then normalize the next one. When you finish, collect the normalized tracks and burn them to a new CD or upload them to your portable audio player. You'll find the quiet parts significantly less quiet, and ultimately that means less fiddling with the volume control. Of course, you'll also be tampering with the work of the highly professional music producer who recorded the material in the first place, so use normalization only when absolutely necessary.

2 Watch Compression Ratios

The secret to uploading and downloading music files lies in audio compression. A four-minute song uses 40MB on an audio CD when you rip it from a WAV file but only 4MB to 5MB as an MP3 or WMA (Windows Media Audio) file. Compression removes portions of the sound unnecessary for human beings. For MP3, set your software's compression preferences at 128-bit compression for good, consistent results. You can go a little lower with WMA, down to 96 bits, in fact, with much the same results. Ogg Vorbis, the completely free alternative, also works well at 96 bits. You can increase the bit rate for any of these for even better performance, but you'll end

up with larger file sizes and you're not likely to notice any difference in quality of sound.

3 Windows Media Player & MP3 Encoding

On installation, WMP (Windows Media Player) configures itself to rip CD audio into WMA format. To save a file in MP3 format from inside WMP, you need to buy an MP3 add-on. You can do so from the Microsoft site (www.microsoft.com/downloads) or by clicking the Learn More About MP3 Formats link on WMP's Options dialog box (accessed from the Tools menu). It's possible that your other CD-ripping software has MP3 encoding as part of the package, but you may have to buy and install a separate component. A dedicated MP3 encoding package, such as Magix MP3 Maker (www.magix.com), adds all the encoding you need.

4 AAC, FLAC & Ogg

You've heard of MP3, and you're probably getting to know WMA, but there are other digital audio file types for portable players. If you're an iTunes customer, you already know about AAC (Advanced Audio Coding), in which all iTunes files are encoded. Others include FLAC (Free Lossless Audio Codec), a format that provides an accurate version of the original but with file sizes that decrease only about 50%, and the increasingly popular Ogg Vorbis, a free, open-source encoding system in use among Linux users but working its way to Windows users, as well. Several recent portable players support Ogg (a few support FLAC), and you can add Ogg support to a WMP at

no cost. Ogg compares to MP3 and WMA for sound quality.

5 Close P2P's Security Hole

If you use Kazaa, Morpheus, or another file-sharing program, you're using P2P (peer-to-peer) software. Although many people use P2P programs to exchange music files illegally, the software has legitimate purposes. In many cases, however, you install it to distribute digital music, graphics, or video files from your hard drive to other users on the Internet. For security reasons, as well as to shield yourself from potential legal problems, you should open your P2P program's Options or Preferences menu and prevent two activities from occurring. First, change the settings so the software does *not* share files with other users. Second, stop the software from loading when you start your computer. Remember that P2P file sharing means you're granting access to your hard drive to any computer on the Internet, and you'll immediately see the importance of setting these options.

6 Collaborate On Songs Over The 'Net

Fancy yourself a musician? Tired of searching for a guitarist, bass player, or drummer who appreciates your music and isn't late for practice? An increasing number of musicians are collaborating over the Internet by sending digital music files back and forth, loading them into their music-recording software programs, re-encoding them into MP3, WMA, or Ogg Vorbis format, and sending them back for additional work. If all collaborators use the same recording software, it's pretty easy, but you can use practically all programs to load a compressed file and, more importantly, save either an individual track or a selection of tracks to that file format. In other words, you can load your collaborator's file into your software, record an acoustic guitar track for it, save the guitar track as a separate MP3 file, and send it back over the Internet. Someone should be in charge of keeping the original WAV files. (You can burn them onto a CD and courier them or mail them to your collaborators afterward.)



7 Video Soundtrack

Video-editing software, such as the freely available Windows Movie Maker 2.0 (www.microsoft.com/windowsxp/moviemaker), lets you include a separate audio track when creating your video. You can retain the original audio captured by the camcorder's microphone, or, if you prefer, you can turn this audio's volume down to zero and rely solely on the separate audio track. Actually, you can have a combination of the two, either by having both audio portions running simultaneously (your viewers will listen to a speech, for instance, while soft music plays in the background) or by fading the original and separate audio in and out. Movie Maker 2.0 accepts several audio types, including WAV, MP3, WMA, and AIFF (Audio Interchange File Format). Import the file into your project and drag it to the audio track on the timeline.

8 Use Music Files Responsibly

In your Web travels, you've undoubtedly come across Web sites that play music. You can add sound to your Web pages by using the <EMBED> tag in Netscape/Mozilla or the <BGSOUND> tag in Internet Explorer. If you create your Web pages using a Web-editing program, such as Dreamweaver or FrontPage, you'll be able to add sound to the page using the program's tools. FrontPage, for example, lets you add WAV, MIDI, RealAudio, AIFF files, and more. However, in all cases, don't start the file immediately (you control this with an HTML setting or a setting within your editing program) and don't loop it repeatedly (looping causes the file to keep playing). Give your Web visitors full control over whether they want to listen.

9 iTunes' Playlists

Apple's iTunes software contains a neat feature called Smart Playlists. In essence, it turns iTunes into a disc jockey, drawing its material from your downloaded music files. Choose the New Smart Playlist feature from the file menu and select the criteria by which you want iTunes to make its selections. You can have the program search for songs by specific artists, genres, number of times played (you might want

it to find some songs you haven't listened to very much, for instance), or even sound quality. You can further set the number of songs, minutes, or megabytes to keep your playlists manageable. Finally, click the Live Updating box to have iTunes continually change the Playlist as you add new songs to your folders.

10 Karaoke On The PC

If you're looking for a charades replacement for your next party, why not have everyone completely humiliate themselves in a karaoke contest? You can buy prepared karaoke CDs, or you can create karaoke tracks out of songs you have on your PC. Download and install a program such as the free DSP Centercut (www.hydrogenaudio.org/index.php?showtopic=17450&), a karaoke plug-in for the Winamp player (www.winamp.com), but you can do it yourself by editing the music files using an audio editor. Cut out the vocals, which typically occupy the center of the stereo channel; by working with a good equalizer, you can eliminate much of the middle while enhancing the nonvocal areas in order to make the vocals less noticeable. Add a lyrics sheet to the mix or create a scrolling one using PowerPoint, and you have a decent little karaoke machine. Even better, some of the original vocal is still present, so the singer won't feel completely alone up there.

11 Player Software

Virtually all MP3 players come with software that lets you transfer and manage songs in conjunction with the device. But, in most cases, you don't have to use this software, opting instead for your favorite music playback programs such as WMP or RealOne Player. Open the Options/Preferences screen for this software, have it locate your device, and use the combined features of your device and this program to make your ripping, burning, and uploading life easier. You can also use Windows Explorer directly to control your device by downloading and installing Microsoft Plus Portable Audio Devices (www.microsoft.com/windows/plus/dme).

12 Organize Your Music Files

Put all of your music files in one place so you can easily get to your songs to transfer them to your MP3 player. You can let your player software do this for you—iTunes, WMP, RealPlayer, and others all offer to do so—or you can be more selective and do it yourself. If you put your files in the My Music folder in Windows XP, you can keep prying eyes and ears away from them by creating a password for yourself via Control Panel's User Accounts applet.

13 Download Music File Info

One of the benefits of having your music files in a central location is that your player software can monitor it and download track information as it finds it on the Internet. This information may include album names and lyrics information. In Windows Media Player 9, open the Options dialog box, click the Privacy tab, and click the option called Update My Music Files By Retrieving Missing Media Information From The Internet.

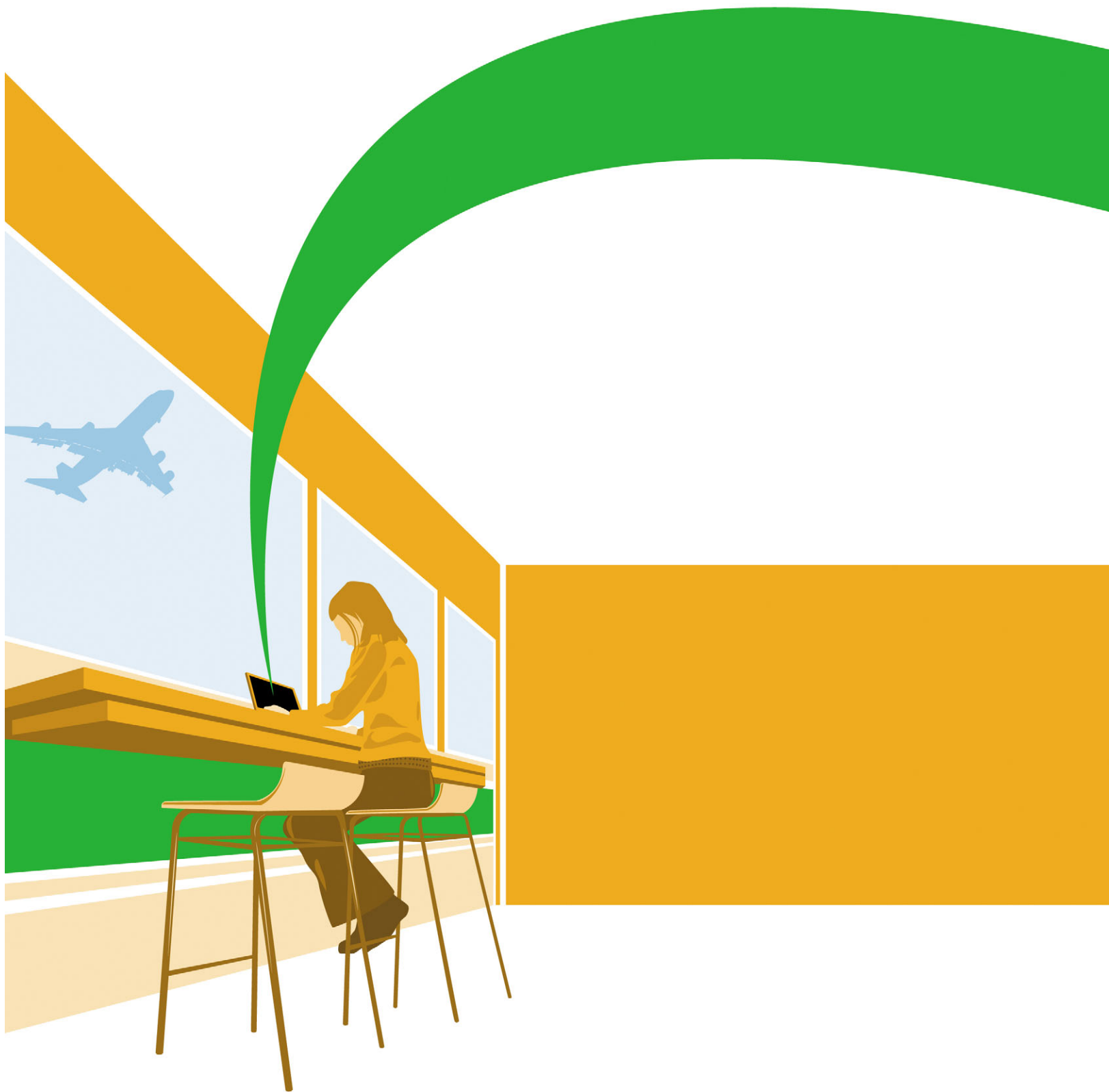
14 Back Up Your Licenses

When you buy a song from a music site, you acquire a license to play that song on your system. Your system keeps licenses in specific locations, such as My Documents in the case of Windows Media Player, and you should copy them to another location manually or have your player software do it for you. In WMP, you can back up any licenses in a specific folder via the License Management dialog box under the Tools menu.

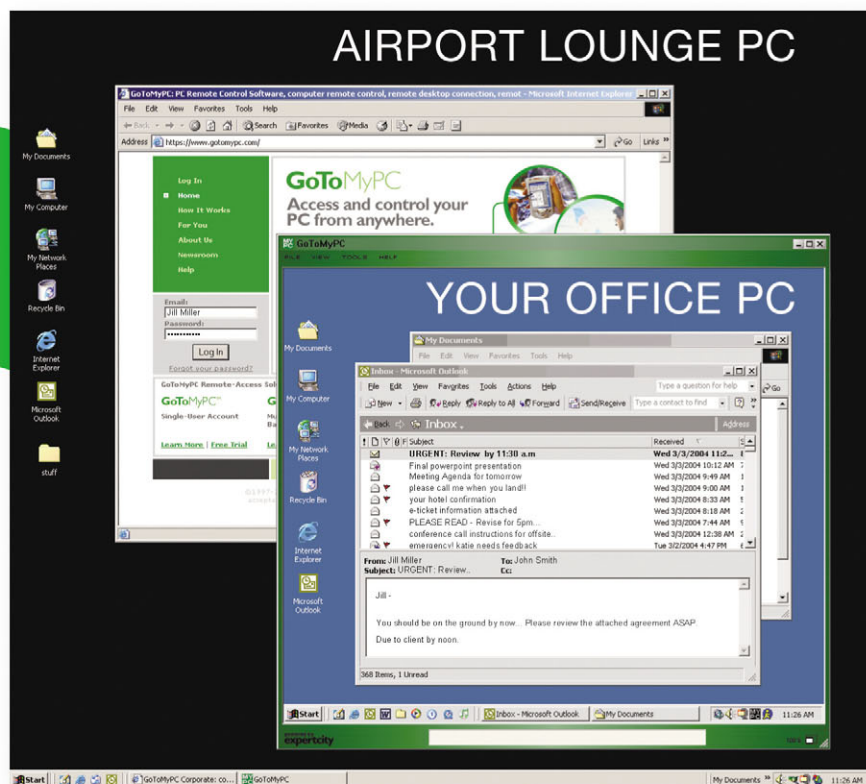
15 Present Song Info

RealPlayer has a feature that lets you change the way the songs you rip from a CD appear in your music library folder. Open Preferences from the Tools menu, click the My Library item and the Advanced My Library underneath it, and click the Change Filenames button. You can adjust the naming convention to include artist, genre, track number, song title, and album title in any order you choose. 

BY NEIL RANDALL



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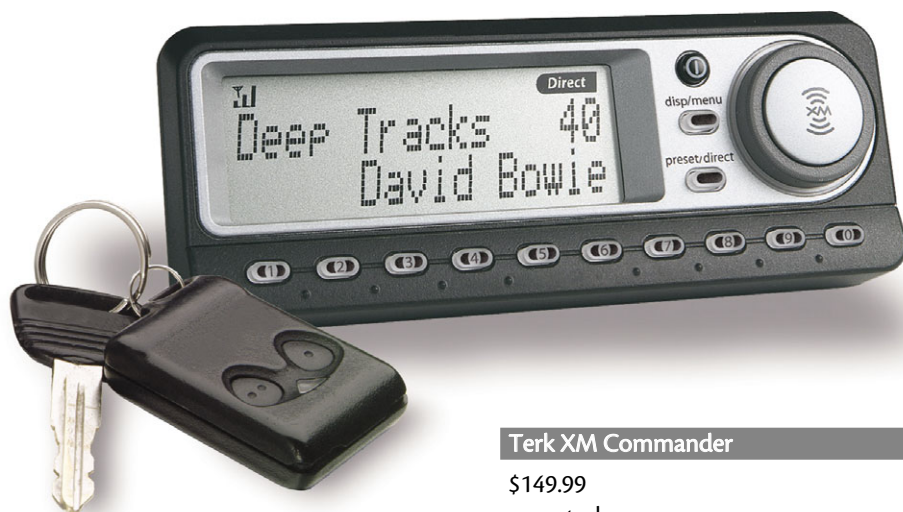
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Terk XM Commander



Terk XM Commander

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Many cars are sold with optional factory- or dealer-installed satellite radio systems (see the article “Star Wars” on page 42 in this issue), but what about those of us with older vehicles who want to benefit from the crystal-clear sound quality, commercial-free lineups, and the dozens of channels that satellite radio provides? Several companies make third-party head units, and there are several plug-and-play devices that connect to a car kit but leave a mess of wires in their wake. Terk has come up with potentially the ultimate compromise with its XM Commander, but it has enough drawbacks to prevent our wholehearted recommendation.

The XM Commander places the bulk of its electronics in a little black box that fits under or behind the dash and sends signals down a long wire to the sleek digital display unit. This unit mounts under or above your existing radio using the included mounting plate, or can be secured anywhere in the cab using the enclosed Velcro strips. You can connect the unit to a modern car stereo via a wired RCA line-out

connection, which is what we recommend, but the black box also contains an FM transmitter that can broadcast the XM signal over a very short range. Using the car’s existing radio to tune the signal lets the product work with practically any car radio made since the days AM radio dominated the airwaves.

Plan to let a pro install this kit unless you are intimately familiar with your car’s dashboard and electrical system. The system taps directly into the rat’s nest of wires that supplies power to and grounds the existing car radio, so there is no way to power it from a cigarette lighter. The antenna, which uses an extremely thin wire, also must be located somewhere on top of the vehicle for best performance, and putting the wire through a window and then rolling the window up is definitely not recommended. Instead, it must be routed through the weatherstripping on the windshield or back window, which is not a fun job and could lead to water leaks if not performed correctly.

After futzing around with fuses and crimping tools for a few hours, we

finally gave up and had a local electronics store install the unit. It quoted a price of \$115 to \$140, but in the end installation cost only \$82.37 and looked very slick, with all the wires tucked out of sight behind the dash, under the carpet, or between the weatherstripping and the frame.

Because the radio in the vehicle where the unit was installed did not have the capability to accept a direct connection, we used FM modulation, which ended up being the XM Commander’s biggest weakness. Sound quality was on par with local FM stations but far short of the excellent quality we’ve heard from direct connections or even tape adapters. The signal didn’t have much of the hiss normally associated with FM radio, but we heard at least some level of unwanted background noise no matter what settings we tried. The backlit LCD screen is easy to read but only displays two lines of information, so there is no way to see the station, artist, and track names simultaneously.

Despite the FM modulation sound quality issues, the Commander’s signal strength was excellent and the radio was a joy to use. You can easily tune stations thanks to the large knob and selection button on the front of the display, and Terk included a remote control that clips to a visor for easy access. The XM Commander also features TuneSelect, which causes the unit to beep when one of your favorite songs is about to be played on another station. Just press the selection button when you hear the beep, and the unit automatically tunes to the station, maximizing the amount of time you get to keep your eyes on the road.

If you have a car stereo system that will accept an RCA connection, the XM Commander is a tough satellite radio to top. Just remember to incorporate the cost of professional installation into the price if you don’t want to waste an afternoon splicing and trying to conceal wires. ●

BY TRACY BAKER

Audiovox SIR-PNP2

The Audiovox SIR-PNP2 is one of an increasing number of plug-and-play products designed to let subscribers use the same satellite radio in both their cars and homes. The radio unit itself plugs into one of three of Audiovox's available docking kits, so moving the radio between different listening environments is literally a snap.

The radio unit is larger than similar units compatible with XM Radio's service (the SIR-PNP2 uses the Sirius service) but sports a bright, lava-orange display that is legible in all conditions save direct sunlight. It comes with a small wireless remote control and won't work unless it is attached to a home or car docking kit. We tested it with the SIRHK1 home kit, which comes with an antenna unit attached to a long cord, an AC/DC adapter, and RCA stereo audio output jacks for connecting to the auxiliary inputs on a



Audiovox SIR-PNP2

\$99.95 (plus \$49.99 per adapter kit)
www.audiovox.com

stereo system. Although the antenna never pulled in a consistently strong signal no matter what window it was placed in, when the system worked, it was easy to use and delivered sound on par with that from any other Sirius radio we've auditioned.

Two car kits are available. The SIRCK2 uses a cassette tape adapter, and the SIRCK1 uses FM modulation, which broadcasts a short-range FM signal that users can tune in using their existing car radio. We tested the SIRCK1, which draws its power through an included cigarette lighter adapter, and sound quality via FM modulation was nearly as good as that from the SIRHK1 home kit. Unfortunately, the FM transmitter conked out a few hours into our testing session, transmitting garbled sound, but the overall excellent design and build quality of the car

kit leads us to believe this was a random problem with our test equipment and not an inherent problem with the hardware. Overall, if you're partial to Sirius and are looking for a very versatile way to get the most out of your subscription, the SIR-PNP2 and a few docking kits represent a great value. ●

BY TRACY BAKER

ZVOX 315 Sound Console

The ZVOX 315 Sound Console promises expansive television sound from a single speaker enclosure at a relatively modest price, but don't throw away your television's surround-sound setup just yet.

The all-black unit is 17 inches wide and 4.5 inches tall so it looks relatively unobtrusive perched atop a television and can even integrate directly into an A/V rack (preferably one that is slung directly below the television). The 315's shielding is very good, so it doesn't cause image distortion when used on or next to a tube-based television, and it doesn't come with a remote control. Instead, an automatic shutoff feature powers down the unit



Zvox 315 Sound Console

\$199.99
www.zvoxaudio.com

when it doesn't sense an incoming signal for several minutes and powers it back up once the signal reappears. It worked great in standard TV viewing, but the unit sometimes shut itself off when we played video games.

ZVOX doesn't include a remote control, so the 315 works best with televisions that have audio outputs that are ad-

justable using the remote included with the television. There is a volume knob on the back of the 315 for establishing the baseline volume, plus a knob for bass and another to adjust the aggressiveness of the unit's PhaseCue circuitry. This technology simulates a surround-sound field by introducing slight delays

in the output of the three enclosed speakers and really does expand the sound field. Unfortunately, it also tends to raise treble levels, so it takes some trial and error to find a setting that works well.

It also is unfortunate that the 315's bass response is so weak. Even with the bass knob cranked to its maximum setting, the 315 simply couldn't reproduce the low notes we've heard from competing units in this category. In fact, our test HDTV's wimpy 15-watt integrated subwoofer pumped out much better bass than this add-on unit. It is possible to attach a separate powered subwoofer, but that just adds more expense and wires, which kind of ruins the point. The 315 may be able to outperform some integrated television speakers, but for a little more money, there are other products available that deliver far better sound. ●

BY TRACY BAKER

Samsung SC-D5000 DuoCam

With the SC-D5000, Samsung introduced the first genuine digital still-image camera and camcorder combination. Almost every digital camcorder tries to slap on a cheap still-picture sensor and pass the device off as ready for double duty. And many digital cameras have the ability to grab a few frames of video, but given the quality of these recordings, it seems the manufacturers added this ability as an afterthought. Samsung, however, decided to get serious about combining the two.

The SC-D5000 includes two lenses, two sensors, and two storage methods. One end of the swivel mechanism acts as a MiniDV camcorder with a 680,000-pixel CCD (charge-coupled device), image stabilization, and 10X optical zoom. The other end sports a 4.13-megapixel digital still-image camera with pop-up flash, 3X optical zoom, and standard flash and focus controls, such as Macro Focus, Night Scene, Auto and Manual Focus, and Auto and Manual Flash. The camcorder records to MiniDV cassettes, and the still camera writes JPEG (Joint Photographic Experts Group) files to Memory Stick media. The two technologies share a 2-inch LCD, a color viewfinder, an on-screen menu, and manual control buttons. The combination unit is surprisingly small, at just 3.2 inches x 3.7 inches x 5.5 inches. And the SC-D5000, at a mere 19.4 ounces, is light and portable.

The SC-D5000 is a breeze to use. In fact, we started recording decent video and still images right out of the box. And after spending 10 minutes with the manual and the on-screen menu, we had a good handle on the device's capabilities. The camera is comfortable in the hand, and its controls are generally well-positioned. It's a little awkward to reach some of the camcorder's manual controls in still-camera mode, though, and the

Forward and Rewind buttons aren't very thumb-friendly. Taking still pictures from a camcorder takes a little acclimation, but it's nice once you get used to it. You'll need a FireWire connection to transfer video to your PC unless you want to display your raw footage directly from tape to a TV using the SC-D5000's composite or S-Video outputs. The included 16MB Memory



Samsung SC-D5000 DuoCam

\$1,399

www.samsung.com

Stick media stores still images, and a USB 1.1 cable lets you copy them directly to a PC or other device. Samsung's software package is somewhat disappointing, however. The included CD installs the SC-D5000's USB drivers and Ulead's Photo Express SE, which works fine for basic photo-editing purposes. But Samsung does not include even a bare-bones video-editing program or anything else related to the camera's video functions.

We shot video outdoors, indoors, in low light, and with a variety of subjects. The camcorder's video quality was acceptable, though not great. Its color quality is poor in low light, and the edges of the video lack the sharpness of higher-quality cameras. Image

stabilization is always a concern with small cameras, as they magnify any movement or jitters. The SC-D5000's electronic stabilizer made a noticeable difference, though you should still use a tripod when a stable shot really matters. The camera's built-in microphone picks up quite a lot of the unit's own noise, including a continuous hum and the noticeable click of every button. If you're shooting in a quiet environment or in a situation where sound quality really matters, use an external microphone. Overall, the camcorder's video quality is passable for most consumer and amateur footage. We'd expect more from a dedicated camcorder at this price, but the added value of a good-quality, still-image option makes up for a lot.

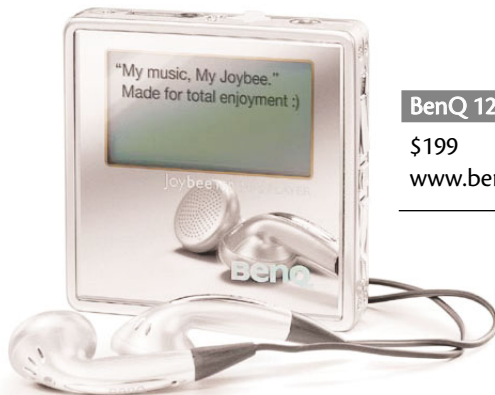
The camera's still-image quality is good, and its color is accurate, though full-sized shots (at 4.3MP) are a little grainy. There's a long delay between pressing the Photo button and the actual shot being taken, which will throw off some of your motion and candid shots. But, overall, the picture quality was sufficient for on-screen viewing and most printing needs. The SC-D5000 doesn't provide the same still-image quality as a similarly priced dedicated digicam, but it beats the pants off the pictures taken by other camcorders we've seen.

Like an early smartphone, the Samsung SC-D5000 isn't likely to appeal to power users of either converging technology. Neither the SC-D5000's video features nor camera features offer the portable size or top-image quality of competing single-use products. But for users who value the convenience and efficiency of eliminating device clutter, it's a tradeoff worth making. The unit is small enough to be portable, its features are robust enough to be useful, and the quality meets most casual users' needs. ●

BY GREGORY ANDERSON

BenQ 128MB Joybee 150

No longer do digital music players simply play music. For example, BenQ's Joybee 150 acts not only as an MP3/WMA (Windows Media Audio) player but also an FM tuner (with 30 programmable presets), FM recorder, voice recorder, and ebook reader. In addition, BenQ includes a line-in cable for transferring music from a PC or stereo to the Joybee 150 (MP3 encoding is built-in).



BenQ 128MB Joybee 150

\$199

www.benq.com

The box is packed with accessories, such as a wired remote, a pair of earbud headphones, a USB cable (note that this player does not support Hi-Speed USB 2.0), a carrying pouch, a wrist strap, and a power adapter. This player has a built-in Li-Ion battery that lasts about 10 hours per charge. If it bothers you that eventually the nonremovable battery will die, this probably isn't the digital music player for you.

BenQ also provides a software bundle that includes QMusic2, which you can use to rip MP3s at bit rates of 128Kbps (kilobits per second), 192Kbps, and

256Kbps, and several utilities, such as the Lyrics Editing & Conversion Tool. With this program, you can type the lyrics for a song and flag the beginning of each line so that the text will

scroll across the Joybee's four-line LCD in time with the music.

We found the Joybee's controls quite awkward, but it wasn't so much the small size of the player (2.3 inches high x 2.3 inches wide x 0.5 inches deep) as the position of the controls that presented problems. Usually, we adapt to button placement very quickly, but it took awhile to get used to operating the Joybee. The player's interface could be more intuitive, as well. For example, when we browsed for music, the directories for text and voice files appeared on-screen, as well. The Joybee's major fault, though, is the omission of a hold button. We frequently bumped buttons when we picked up the Joybee or carried it in a pocket.

Although the Joybee 150 has some nice features, there are other players, such as iRiver's iFP-390T, that are better designed, have many of the same features, and are a much better value. ●

BY KYLEE DICKEY

Blaupunkt TSx652

The TSx652's light blue styling is definitely cool, but there's more to these speakers than just good looks. Blaupunkt's TS (Transparent Series) coaxial, component, and subwoofer models combine quality components and solid performance. The ability to impress passengers with their appearance is just an added bonus.

The model we reviewed, the two-way TSx652 coaxial speaker, is a 6.5-inch coax speaker pair supporting up to 50 rms (root mean square) watts and 150W of peak power apiece. Their frequency response is 60Hz to 20KHz, so you'll get plenty of range. At 2.2 inches deep, they'll fit in tight spaces. The woofer cone is made of semitransparent blue polycarbonate with a foam surround. The 1-inch Mylar tweeter cone sits above the woofer, also in blue. The speaker's clear plastic grille shows off its inside and lets



Blaupunkt TSx652

\$89.95 per pair

www.blaupunktusa.com

backlighting glow through. You'll have to provide your own lighting, though. Similar design features run through the entire TS line, which includes everything from 3.5-inch coaxial speakers to component sets to 12-inch subwoofers.

We could hardly wait to give the speakers a test drive, and they stood up well to our scrutiny. In our listening tests (in the showroom and on the road), the TSx652s delivered richness

and clarity across a variety of music types and audio sources. They compared favorably to several more expensive two-way models (which sounded either too bright or too indistinct) and predictably blew away factory speakers. The speakers' mids and highs were well-formed, though we needed to customize the equalizer settings on our head unit. The standard 6.5-inch units don't fit cleanly into oversized openings, though we were able to mount them with a little professional assistance.

People dedicated to auto accentuation will find plenty of ways to have fun with Blaupunkt's TS speaker line. But those who just want good sound from car speakers will appreciate the TSx652s as well. Their sound quality is good, and their value for the money is even better. The TSx652 is a great way to upgrade the quality of your car's sound. ●

BY GREGORY ANDERSON

B&W 704 Speakers

Some stereo fanatics have no problem spending several thousand dollars on very high-end speakers. Music coursing through the electronic veins of such expensive equipment sounds great, of course, but most of us can't or won't pony up so much money for the experience. Bowers & Wilkins' 704 speakers are designed for those of us who are willing to pay handsomely for superior sounding speakers, but not so much so that we'd have to mortgage the house. In other words, the 704s are like a starter set for budding audiophiles.

The 704s look like they cost a small fortune. The slightly curved top of the speakers dodges the boxy look of most floor-standing units, and B&W ensconces the speakers in a real-wood veneer that looks nothing short of fabulous. You can choose from maple, cherry, walnut, black ash, or rosenut finishes; our test speakers came in the rosenut finish, which we loved. The 704s are floorstanding speakers, but they aren't especially bulky, measuring 37.7 inches high x 8.7 inches wide x 12.6 inches deep and weighing a mere 46 pounds each.

Although the 704s look like fine furniture, their aesthetic value isn't as important as the excellent technology beneath their cloth grilles. The speaker's 6.5-inch midrange is made of woven Kevlar, and the 6.5-inch bass driver is made of a paper/Kevlar blend. In other words, these drivers are tough. The speaker's metal alloy 1-inch tweeter, which is based on B&W's famous Nautilus speaker design, slips quietly out of the speaker's curved top. The speakers have a sensitivity of 90dB (decibels), and the frequency response range is from 40Hz to 25KHz. The 704s max out at 150 rms watts, which should provide more than enough pop for most listening environments.

We pulled out several of our favorite CDs for the 704s' trial run, and we were impressed by their superb smoothness and clarity for each piece of music we

played, though it seems clear that they especially favor classical music. We listened to Edvard Grieg's "Peer Gynt Suites" first ("Ase's Death" and "Anitra's Dance" from Suite No. 1, Op. 46, among other selections), which was a delicious experience. The 704s' sonic detail was



B&W 704 Speakers

\$1,100 each
www.bwspeakers.com

amazing, especially for tones in the upper frequencies.

We pulled out some other classics next, including Dire Straits' "Brothers In Arms." The album's title track sounded very rich, and the 704s imbued Mark Knopfler's guitar with a warm, striking hum. Johnny Cash's "Rusty Cage" from "Unchained" simply rocked. We could practically feel the vibrations from Johnny's steel guitar strings against our fingers. We listened to Lucinda Williams' "World Without Tears" last, and the 704s enveloped us with her sharply southern vocals.

We didn't limit our testing solely to CDs, however. Many floorstanding speakers now have to pull double-duty as the front speakers in 5.1 or 7.1 home theater setups, and the 704s are equal to the task. We listened to (and watched) one of our favorite recent films, "The Lord of the Rings: The Two Towers." The 704s pounded out the film's fight scenes well, delivering a satisfying bass thump that was not quite on par with that of a good subwoofer, but not bad by any means. The dialogue in the film sounded crisp, and the speakers did a better job than we expected of capturing the film's subtle ambient sounds. The 704s also created a spacious sound field even without the assistance of a center channel or surround-sound speakers.

B&W's 704s aren't the best speakers on the market—they're not even the best speakers in the B&W 700 series (that would be the 703s, which cost about \$400 more apiece). But they sound excellent, and, although pricey, they're within the reach of many consumers who have a passion for really good audio, even if they don't quite consider themselves audiophiles. The 704s' construction combined with B&W's considerable audio expertise is hard to beat, so we'd happily pass on a few extra nights at the movies to save up for these gorgeous speakers. ●

BY MICHAEL SWEET

Creative Sound Blaster Wireless Music

Not content to leave the wireless music scene to upstarts such as Slim Devices, Creative has introduced the Sound Blaster Wireless Music system that lets you access the music stored on your computer through your stereo system. Although once a novel idea, we wish that Creative was bringing something new to the party. Sadly this isn't the case.

The Sound Blaster Wireless Music system is basically a small 802.11x device that connects to your home stereo or powered speakers. You control the base station through a remote control that uses RF (radio frequencies) to communicate. Where the base station has styling that is, at best, pedestrian: The remote will remind you of a stun gun, albeit with

an LCD. This is the one gem of genius in the whole system, but Creative has chosen to shroud this gem in possibly the ugliest remote we've ever seen. It's hard to decide what's worse, the remote or the clunky name Creative has assigned to the system. Ironically, Creative has included a "find my remote" feature in case its garish design doesn't give away its location first.

Setting up the system is extremely easy, especially if you aren't using WEP (Wired Equivalent Privacy) on your wireless network. Once you've installed the bundled software, just power on the system, and it will auto-detect your network. If you're using WEP, you'll need to connect

the base station to your PC with the bundled USB cable and manually configure your network settings.

Creative ships its own jukebox software, and we found it to be a competent program, although it did have trouble recognizing songs that we had converted to the MP3 format using other programs. The system works with MP3 and WMA (Windows Media Audio) files, but, like most streaming audio devices, it can't cope with DRM (digital rights management)-protected audio files.

On the whole, Creative has failed to come up with a serious competitor in this burgeoning field. Their system is the same price as Slim Device's incomparable Squeezebox yet lacks the capability to work with wired networks. It also is completely Windows-centric. We're not sold on Creative's wireless system. ●

BY CHRIS JACKSON



Creative Sound Blaster Wireless Music

\$199.99
www.creative.com

Yamaha DVX-S120P

Purchasing and setting up a home theater for the first time can be an intimidating task. For many consumers, an HTiB (home theater in a box) system is the easiest way to go. These all-in-one systems provide all the components you'll need except for speaker cables.

Yamaha is well-known for high quality audio systems, and its DVX-S120P Cinema Station is no slouch. It includes a 5.1-channel receiver with a built-in DVD/CD player, five speakers, and a subwoofer. All of the DVX-S120P's components are clad in a futuristic silver design that blends in with today's flat-panel televisions.

The receiver/DVD player is a competent system, supporting both Dolby Digital and DTS (Digital Theater System) encoding formats for your DVD's surround sound. The total power for the



Yamaha DVX-S120P

\$799.95
www.yamaha.com

receiver is 275W, at 55W per channel. In addition to DTS support, the receiver also features DSP (digital signal processing) that can create more than 40 surround programs to match both the audio source and your listening conditions. It features one component video output, one S-Video output, and one composite video output. For digital audio, it has one optical input and one output.

For DVD playback, the DVX-S120P supports progressive scan for the highest

possible image quality. Like many DVD players, it features 3:2 pull-down correction for viewing film-based DVDs. In addition to DVD playback, it can also play CDs, CD-Rs, VCDs (Video CDs), and most DVDs burned on a PC or DVD recorder.

All five magnetically shielded speakers are two-way speakers with quite small cones. Despite their diminutive size, the speakers' sound quality was quite good. The subwoofer has an 8-inch driver, but we weren't as impressed with its quality. It tended to be a bit "boomy" for our tastes, no matter where we positioned it.

Overall the DVX-S120P is a strong contender in the HTiB field. Both its sound and picture quality matched single components costing as much as the entire DVX-S120P package. The futuristic styling may not age as well as Yamaha would like, but long after it's considered passé, the DVX-S120P will make your house feel like the local Bijou. ●

BY CHRIS JACKSON

CE Face-Off

DVD/VCR Combination Players

Combination players are the Reese's Peanut Butter Cups of the home entertainment center:

"You got your DVD player in my VCR!"

"No, you got your VCR in my DVD player!"

Whoever caused the collision, combo players definitely come in handy if you're short of shelf space or if you're simply a consolidator who doesn't see the point of having two boxes when one will do the job. At the very least, a combo player means one fewer remote control to keep track of.

Come One, Come All

We rounded up half a dozen players from manufacturers that have been stocking home entertainment centers for a long time. For each model (with one exception), the list price hovers south of \$200. Among the overall feature lists there are few surprises. Both DVDs and VCRs are mature technologies (okay, by now the VCR may even be looking geriatric), and we've come to expect certain features as standard.

On paper, then, our six units seem more alike than not. All combine progressive-scan DVD players with four-head VCRs. The DVDs have component video and S-Video outputs, or, in a pinch, can play through the separate composite video (and stereo audio) A/V outputs used by the VCR. All DVDs relay Dolby Digital and DTS (Digital Theater System) audio encoding. In addition to their own stereo analog outs, most provide both coaxial and optical outputs to send digital audio to a multi-channel receiver. Most also add two sets of standard A/V inputs; one on the back, for more permanent connections

(such as a playback deck for dubbing) and another along the front, for temporary hookups (such as a video camera).

But wait, there's more. All six are compatible with the usual media suspects: DVDs, audio CDs, and writeable and rewriteable discs, plus VHS, Hi-Fi VHS, and Super VHS tapes. All play MP3 and JPEG (Joint Photographic Experts Group)

emulation to enhance the audio of DVDs playing through stereo televisions and speaker systems. For noise-sensitive households, all the players let you attenuate the dynamic range by compressing volume to a more even level so your housemates aren't blown out of their socks after you've cranked it up to hear whispered dialog. And all the DVD players and VCRs alike offer variable search and slow-motion speeds, plus frame-by-frame advance.

That's a lot of overlap. So any slug-it-out comparison must come down to nitpicking over the implementation of specific features (not all of which are going to have the same importance for every viewer), general convenience, and, of course, performance. And we'll say up



JVC HR-XVC26U

photo discs; half are also compatible with WMA (Windows Media Audio) discs.

Working our way inside, all the VCRs operate at two recording speeds: a standard speed that fits two hours on a T-120 tape and a long play speed that records for six hours per T-120. Four units (the LG and Zenith models excepted) automatically record an index marker whenever recording is initiated, for easily locating the starting points of each segment. All the combo players we reviewed feature one-touch recording in addition to timed programming. Five will let you dub VHS copies of non-copy-protected DVDs.

The DVD players in all the units feature password-protected controls for discs with encoded ratings, so parents can block material unsuitable for kids. They provide a way of setting temporary A-B markers for a repeat loop, and all but the JVC permit temporary bookmarking of locations for later return. All incorporate a proprietary surround-sound

front that, across the board, we didn't find anything to gripe about with the DVD players' performance.

JVC HR-XVC26U

\$179

www.jvc.com

Despite this unit's skimping on connections—it has no optical audio out and only one set of A/V inputs, front mounted—it makes up for these in other ways. Let's kick off the kudos with the Instant Review button, a one-touch trigger to power on, rewind to the beginning of your last recording, and start playback. We also found the player's Next Function Memory a clever touch; it's a way of combining button-presses to instruct the machine what to do after it has rewound a tape: play, shut down, eject, or go into programming timer standby.

This was one of our favorites for quality of VCR recording and unique in that it offers four playback modes

Burn, Baby, Burn

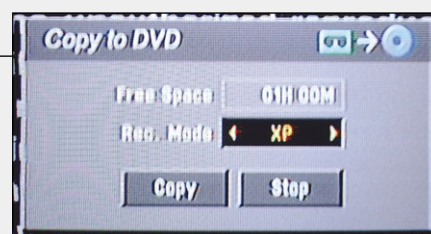
The death knell might not be sounding for VHS players just yet, but the bell-ringer is eyeing the rope. As prices for hard-drive-based video recorders continue to fall, they'll increasingly become the tool of choice for plucking the fruit of the airwaves. But VHS tape should have a prolonged existence as a legacy format. There are just so darned many of those black plastic slabs out there, and converting an entire collection of The X-Files or Star Trek episodes to disc is a heavy burden even for fans who aim to keep those video treasures forever.

Tapes deteriorate, though. For anything worth salvaging, as long as it's not copy-protected, LG Electronics' LGXBR342 makes it easy to digitize the material for the long haul. Here's how.

Pop your videotape and a blank DVD-R or DVD-RW into their respective slots. Set the unit to VCR mode with the remote or the front panel's toggle button. Advance your video tape to the point at which you want to start playback. For the quickest start when copying begins, put the tape on Pause instead of Stop.

Now press the Copy button on the front panel of the player, or on its remote. This will open a simple on-screen dialog box in which you'll use the remote's arrow keys to select one of three recording modes. You'll also see the amount of time you can squeeze out of the disc, depending on the mode you choose: around four hours at LP (low quality), two hours at SP (standard quality), and one hour at XP (high quality).

Make quick DVD copies of your VHS tapes using the LG's simple interface.



When you've selected the mode, press the Enter or Copy button. And that's it. The tape will play, and the DVD burner will copy it in real-time. Just press Stop when the tape finishes.

At this point your newly burned disc will play just fine in the LG, but nowhere else. To be compatible with other DVD players, the disc must be finalized. So switch to DVD mode. Press Setup and navigate to the bottom icon, Disc. Select Disc Finalize (at this point you can also choose to name the recording you've just made), select Finalize, and

then press Enter. Select OK in the dialog box and press Enter again.

A few words about your choice of discs: When you use a DVD-R, the unit initializes it in Video Mode for normal playback. When using a DVD-RW, you must choose between initializing it in either Video Mode or VR Mode. With VR Mode, you can substantially edit the recording even after it's made, including dividing it into chapters, adding titles, and more. The drawback? If you want to view the disc elsewhere, it will probably work on only the newest players. ■

depending on the material or condition of the tape. Overall, the JVC lets you fine-tune what you're seeing and hearing the most. For DVDs, the VFP (Video Fine Processing) menu lets you select between two viewing modes, plus configure two of your own by setting six parameters (gamma, sharpness, etc). The 3D Phonic option provides three content-oriented surround modes (Action, Drama, and Theater), each of which has a distinct effect on the sound.

DVD interactivity is generally well implemented, too. You can summon a one- or two-line menu bar for quick, clear access to numerous options: camera angles, chapter and time locations, choice of audio tracks, and more. When watching letterboxed content on

a TV with a standard 4:3 aspect ratio, these menu bars will fill the black masking bars across the top of the screen, without blocking a thing. You also have menu bar and dedicated-button access to subtitles, which comes in handy whenever you need to make sense of muddled dialog.

In addition to the parental ratings function, the JVC sports a separate Child Lock to completely shut the unit down for those occasions when you can't trust the little guttersnipes at all. You do need to keep the remote hidden, though.

Things we found less than impressive were relatively minor: The XVC26U's A-B marker function is accessible only from the menu bar. The unit doesn't

have a dedicated button for it. As for the absence of a remote button for Tape Eject or DVD drawer Open/Close ... what were they thinking?

LG Electronics LGXBR342

\$749

www.lgeus.com

Standing 3.25 inches tall, this is the slimmest unit we reviewed. But at 14 inches deep (further extended by a small fan housing) and weighing 15 pounds, it's also the heavyweight champion, with a price to match. The LGXBR342 doesn't merely play DVDs; it also records them.

At first glance, the LG (LG Electronics has been the parent company of Zenith



LG Electronics LGXBR342

since 1995) appears to possess the cleanest front panel in the bunch, with no controls at all. That's just an illusion. The bottom half is a clear, dark flip-down panel that reveals the basic controls, a second set of A/V inputs, and an i.LINK (aka FireWire) input for connecting digital video cameras.

With few exceptions, we were extremely impressed by the build quality and thought that went into this unit. From any input, including the TV, you can record to your choice of tape or any format of blank DVD. The LG unit's recording quality, even on tape, is among the very best of the bunch, and the unit can also upconvert the VCR signal to a progressive-scan signal.

Hands down, the LGXBR342 has the best on-screen displays. They're not only simple to navigate, but usually translucent, so you don't miss what's going on behind them. Moreover, they're just plain gorgeous to look at, with icons and graphics that wouldn't appear out of place on a PC. That extends to the photo-viewing interface for JPEGs.

LG sweetens DVD playback with some nice touches. When you wish to return to marked locations, they're represented by a collection of thumbnail images. The bottom row of four remote buttons provides well-organized access to interactive features: Audio, Subtitles, Camera Angles, and Zoom. But slide down a panel and you'll reveal even more controls, including a dedicated A-B button. This is also one of two remotes whose main playback controls glow in the dark. You can even toss your TV remote into storage, as long as you have a set from one of the five manufacturers compatible with the one-time coding setup for the LG's remote.

The only blemishes on the LG are its VCR's lack of indexing and a commercial-skip button. And, of course, you're not getting an internal hard drive, but that's asking the unit to be something it's not. It's intended to combine DVD authoring with videotape and external camera gear, and in that, it performs exceptionally well.

Philips DVD750VR

\$169.99

www.philips.com

If you're looking for sleekness and flash, this isn't the unit for you. It's the wallflower of the group but is in most respects a fairly solid performer and unique in our group in that it supports the VCR Plus+ Programming system. VCR Plus+ lets you key in a program's code number to set timed recording.



Philips DVD750VR

But Philips clearly cuts a few corners here: no optical audio out and no Eject or Drawer Open/Close button on the remote.

The VCR also had the least satisfactory altered-speed playback of any unit. During a frame-by-frame advance, tracking distortion obliterated roughly the top 25% of the screen; it was even worse in slow motion. And while the documentation promises two speeds of fast-search during playback, we never

could convince the super-high-speed search to kick in.

Still, the unit's recording quality was among the sharpest, although we noticed some subtle color flickering here and there on playback. Both Virtual Surround modes sounded good, but the manual neglects to explain what either is optimized for.

If you merely want the basics, with few frills, at a bargain price, this player just might do it for you.

Samsung DVD-V3650

\$149.99

www.samsungusa.com

At a smidge over 3.25 inches tall, the Samsung is another of the slimmest units here (along with the LG), something to consider if every millimeter counts. And, like the LG player, you can control your TV with its remote, except this one is compatible with 17 brands.

Thumbs-up go to the remote's EZ View button, which lets you toggle among four viewing options for DVD. All the units we reviewed have a basic Zoom button, but the V3650 expands on the concept, with different results depending on the aspect ratio of your TV and the material you're watching. For instance, on

a standard 4:3 TV, you can switch among letterboxed and full-screen pan-and-scan views (even for 16:9 formatted discs) and even a stretched view. Overall, the Samsung had another of our favorite menu systems, not only a breeze to navigate but nice to look at.

On the not-so-stellar side, although the unit played audio discs fine, it only scratched its head during the JPEG test, despite our photo discs meeting the manual's requirements. Also, while



Samsung DVD-V3650

we were happy with the DVD video, tape recordings made on the unit looked a little jumpy on playback, although recordings from other machines played smoothly.

Finally, if you want to tape copies of unprotected DVDs, look elsewhere. The Samsung is the only one of our half dozen that doesn't do dubbing.

Toshiba SD-V392

\$139.99

www.toshiba.com

The SD-V392 has several features we like, including an A-B button, glow-in-the-dark buttons, a good implementation of finding videotape index markers, a



Toshiba SD-V392

nicely consolidated Jump control to navigate a DVD, and support for WMA files.

Unfortunately the DVD clearly seems to be the unit's better half. With some recently recorded tapes made on an older player, the automatic tracking never seemed able to settle on whether or not it wanted to run at Standard Play or Super Long Play. The constant hitching and glitching was painfully unwatchable and unlistenable, and no manual tracking adjustments helped. These videos didn't give any of the other players a flicker of trouble, so we hesitate to blame the tapes. Although the SD-V392's playback of recordings was at least smooth, the

image quality was less than satisfactory, with a coarse appearance similar to a second-generation dub, even at SP using a fresh premium-grade tape. Strangely enough, however, these recordings looked better when played on other units. We can't say we were much impressed by the playback quality of commercially recorded tapes, either.

And while we're at it, whoever approved the Spatializer Virtual Surround needs to have his ears examined. We have plenty of basis for comparison for emulated surround here, so we're pretty sure that turning it on shouldn't sound as though it were installed backwards: reducing the volume and pinching the stereo image.

Zenith XBV342

\$179.95

www.zenith.com

With a full complement of connections and an attractively pinstriped



Zenith XBV342

control panel, the Zenith made a good first impression and never let us down after that. This unit's most obvious unique feature is the VCR's EZ Review button, an instant replay that halts playback, reverses the tape to a spot of your choosing, then plays the selected area twice before continuing. Do a bit of digging and you'll find that the DVD offers three modes to optimize performance even further when using progressive scan. It's also the only unit here that activates a screen saver when the DVD has been stopped for more than five minutes.

The XBV342's VCR recording quality was among the best: clean and clear and stable. Although the VCR's menu graphics look average, on the DVD side, they're very similar to those we fell in love with on the LG. The DVD offers six Zoom levels, up to nine markers, and although the 3D Surround Sound had just one mode, it was among the best sounding in the group. You won't have trouble pressing these options into service, either; the remote has a logical layout with everything you need at your quick disposal.

Finally, we must compliment the JPEG interface, which consolidates a thumbnail view with on-screen slideshow options. When activated, the slideshow even uses different transition effects to reveal new pictures.

There Can Be Only One (Or Two Or Three)

We wouldn't kick most of these units off the shelf for playing a Rob Schneider movie. But if we have to hang onto one, rather than send them all back whence they came, the choice is a no-brainer: The LG Electronics LGXBR342 would stay. It feels as solid as a rock, the recording

Most Wanted Features

Progressive scan. We furnished an in-depth explanation of progressive scan in the April issue's "Dejargonator" column, but in a nutshell, progressive scan refreshes the screen image on the TV at twice the rate of interlacing (every 1/60 of a second rather than every 1/30 of a second) for a clearer, brighter picture. The player, however, needs a component video or DVI (Digital Visual Interface) connection to a TV that supports progressive scan. Even if you don't yet have a TV with component inputs, it never hurts to invest in equipment now that will expand with a future purchase. Applies to: all six.

Four-head VCR. We're not sure if anyone even makes two-head VCRs anymore, but in case you come across some dusty specimen at an irresistible blowout price—stop! In a four-head system, the benefit doesn't come from the whole four-some being engaged at the same time. Rather, one pair of heads is dedicated for fast tape speed and another pair is optimized for slower tape speeds, which improves performance when you're

trying to squeeze the most time out of your tape. Applies to: all six.

Wide disc compatibility. With disc players occupying center stage in most of today's home entertainment centers, you can't have too many titles to choose from. Not just for movies, but music and photos too. One disc packed with JPEGs, MP3s, and WMA files can keep you occupied for hours. Who handles all three: Samsung, Toshiba, Zenith.

Commercial skip. TiVo viewers shouldn't be the only ones who get to zap commercials with ease. It doesn't seem too much to ask to equip a unit with an option to fast-forward videotape in one or more 30-second intervals. Who heeded the call: JVC, Samsung, Toshiba, Zenith.

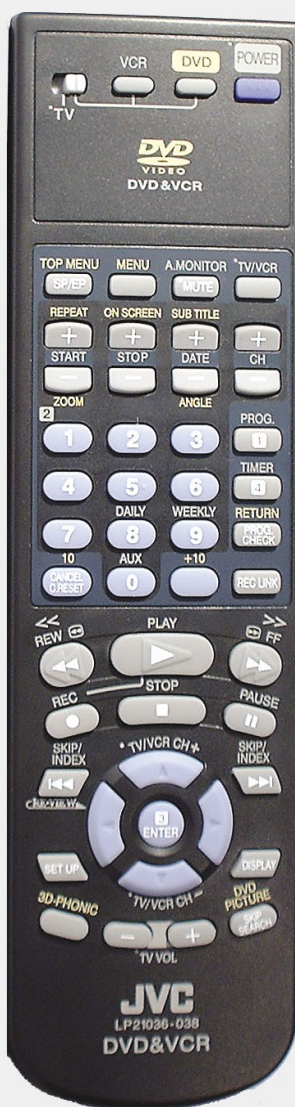
Dedicated A-B button. Can you really see the majestic arrival of the Trojan Rabbit in "Monty Python and the Holy Grail" too many times? We don't think so, but your tastes may differ. To facilitate one's personal greatest hits loops, who really wants to dig into an on-screen

menu? We believe the procedure should be no more complicated than this: (1) Press A-B button to set A.

(2) Press again to set B. (3) Enjoy. Who shares this belief: LG Electronics, Philips, Toshiba, Zenith.

Well-conceived remote control. In prehistoric times, remotes looked as simple as early calculators. Now, though, remote buttons, and the player functions they represent, multiply like rabbits. It takes careful planning to craft a remote that feels intuitive, is easy to adapt to, and doesn't come across like a jumble of haphazardly arranged buttons, especially in a combination DVD/VCR player, when many buttons have dual functions. So what constitutes a winner? Judicious use of color-coding is usually the key, but ultimately, we just know one when we see one. Which companies nailed it best: JVC, LG Electronics, Zenith. ■

Overall the JVC remote was our favorite for design. It feels good and makes effective (if understated) use of color-coding for the buttons and their labels alike. A shame about that omission of an Eject button, though.



quality is unsurpassed, it looks sleek and sharp on the shelf, and it's not only easy and intuitive to use but quite versatile.

That said, it's apples and oranges comparing the LG with the other units. They may all be combination players, but the LG is simply in an altogether different league than the other five. And maybe you can't justify a unit costing three to four times as much as the competition, or need the extras it offers.

So what then? No one unit has every single feature we liked, but the Zenith XBV342 and the JVC HR-XVC26U come close. Both list for \$40 more than the cheapest unit in the bunch and are so much more fully realized machines. Both performed admirably, and in each instance, whatever misgivings we had were small matters. It really comes down to which features lure you in and which omissions are dealbreakers. For

our tastes, though, by a slim margin we give the nod to Zenith's XBV342. It won us over with the extra connections, a remote that didn't make us hunt or dig for everyday functions, and its choice of progressive-scan modes, which strikes us as the most forward-thinking feature in the group. **CE**

BY BRIAN HODGE

SnapStream Beyond TV 3

If you have trouble remembering to tape your favorite shows or want to save shows to your hard drive instead of VHS tapes, it's time to take a look at a DVR (digital video recorder). DVRs, such as Tivo, can tape dozens of hours of high-quality TV shows. (Well, the recordings are high-quality, at any rate.) But a DVR is more than just the digital equivalent of a VHS tape. It lets you easily view listings and pick out future shows without entering codes or trying to figure out Timer Record settings. Unfortunately, it means adding one more electronic box to your entertainment system's already huge stack of equipment—that is, unless you use your computer as a DVR. SnapStream Media's Beyond TV 3 lets you do just that.

Showtime

You'll need a TV tuner card to bridge the gap between the television source and your PC. You can buy a TV tuner card (SnapStream lists compatible cards on the Web site's System Requirements page) or you can buy one of SnapStream's hardware/software bundles. The Beyond TV 3 and Hauppauge WinTV-PVR 250 bundle includes a PCI (Peripheral Component Interconnect) card and a special remote control for \$199.99. The Adaptec VideOh! TV Tuner bundle also has a remote and costs \$50 more, but the tuner is external, which means you can easily move it to any other computer in your house or office. We reviewed the WinTV-PVR 250 bundle.

If you have a cable modem and also use cable to watch TV, you'll need to make sure both cables reach your desk. You don't need Internet access to watch or record shows, but you will need it to download SnapStream's detailed Program Guide. Once you register for your free, lifetime SnapStream

account online, Beyond TV 3 scans your channels and displays complete listings for the channels you receive. The Program Guide also displays brief show summaries and, if a show isn't new, the date it first aired. When you click a show, the Guide offers several recording options, including Record This Episode and Record All Episodes. If you want to record only episodes airing for the first



time, click Record All New Episodes. The View Upcoming Episodes feature displays all of the show's upcoming air dates and lets you tag individual shows for recording, which means you can record only the "Buffy" repeats you haven't seen.

We like Beyond TV 3's Live TV feature. The picture was vibrant and bright on our test system, which included a 256MB Sapphire Radeon 9600 video card and AMD Athlon XP 2100+ processor. The GUI (graphical user interface) displays top and bottom transparent panels that display several options without blocking much of the show. The upper panel displays the date, time, recording status, and a slidable Volume bar. The lower panel houses the show summary and lets you configure several video display options, including Brightness, Contrast, and Gamma. You can also access the Program Guide from the lower bar. Both panels retract when the mouse is inactive for more than a few seconds.

Commercial-Free Bliss

Of course, Beyond TV 3 simply wouldn't be a DVR application without time-shifting and commercial-skipping features. Beyond TV 3 disables time-shifting by default, but you can easily enable it in the program's Settings section. Time-shifting lets you pause a television show as it airs. You can stop the show, grab a snack, and start the show without missing anything. Of course, you can also fast forward and rewind the show. SmartSkip

SnapStream Beyond TV 3

\$79.99 (\$199.99 with Hauppauge WinTV-PVR 250)

www.snapstream.com

detects commercials and inserts Chapter tags into recorded shows. As a result, you can bypass commercials by skipping to the next chapter. Beyond TV 3 also includes a handy seven-second Replay feature. It

doesn't replay the scene in slow motion, but it will solve any "What did she just say?" problems.

Beyond TV 3 records shows in the MPEG-2 (Moving Picture Experts Group-2) format. If you want to transfer an episode to a device that doesn't have much storage space, such as a Windows Mobile-based PDA, you can use the program's ShowSqueeze feature to recompress the video to the WMV (Windows Media Video) format.

Whether you want to watch TV from your desk or your couch, you'll enjoy Beyond TV 3's easy-to-use interface. You can view the software's new ViewScape GUI from up to 10 feet away, and the bundle's remote control lets you easily flip through menus, select shows, and change settings. Beyond TV 3 supports Windows 2000/XP. ATI users in particular will want to download the latest version (3.4.4), which features overlay support and provides a better picture than the previous version. ■

MixMeister Express 5

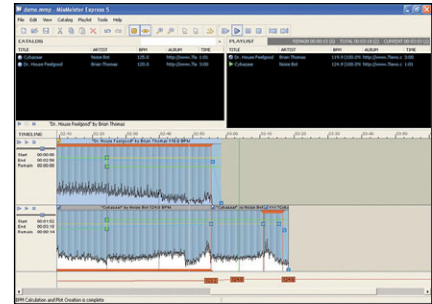
Digital media players organize your music and let you create playlists, but most lack even basic mixing features. The average player is more than enough technology for most users. They can add their songs to a playlist, hit Shuffle, and kick back. But if you hate the brief seconds of dead air that separate tracks or want to meld your existing songs into entirely new tunes, you'll need to invest in mixing software. MixMeister Technology targets MixMeister Express 5 at new and casual users.

We're glad to see that you can resize the GUI's (graphical user interface) three main windows because the detailed Timeline window cascades your mix's songs. If you plan to mix more than a few songs, you'll need to expand the Timeline. The other two windows include Catalog, which acts as a bullpen for your songs,

and Playlists, which houses the songs that make up your current mix. MixMeister automatically displays the Playlists window's songs in the Timeline and overlaps them, which eliminates dead air.

You can use the Timeline to reverse tracks, adjust the tempo, and set Treble and Bass Volume markers. Thankfully, the Tempo markers sit at the bottom of the Timeline instead of cluttering the song segments. MixMeister assigns different colors to each type of marker, but if you don't recognize a marker, you can roll the cursor over it to display the item's label.

MixMeister uses its own rhythm algorithm to match multiple tracks' beats. If you want to fade the end of one song into the beginning of the next, you can switch to Standard Mixing mode. You can save the mix as a WAV or WMA (Windows Media Audio) file or use MixMeister to burn it to an audio CD.



MixMeister Express 5

\$49.95

www.mixmeister.com

MixMeister supports MP3, WAV, and WMA music files and MMP and M3U playlist files. You won't need a souped-up computer to use MixMeister; it supports 400MHz Pentium II and newer PCs. If you deejay by night at local clubs, you'll want to take advantage of MixMeister Pro 5's on-screen VU (Volume Unit) meters and other extras, but if you deejay by day in your pajamas, you'll find everything you need in the streamlined version. ■

PocketMac iPod Edition 1.0

Although Apple barely clings to its computer market toehold, its grasp on the digital music player industry is another story. iPods have high-capacity hard drives (up to 40GB) and stylish bodies, and their younger siblings, the mini iPods, regularly steal the hearts of stalwart Mac decriers.

The iPod also doubles as a limited PDA, storing document files and displaying contact and calendar information, but it can't synchronize personal data with your computer as easily as a PDA. To that end, Information Appliance

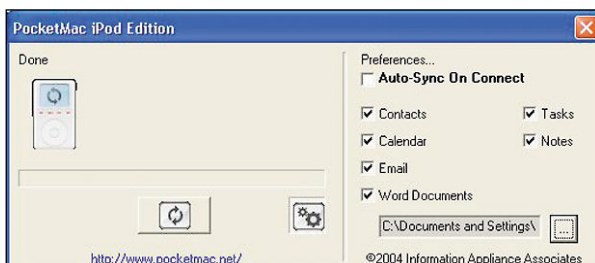
Associates offers PocketMac iPod Edition, which syncs your iPod with Microsoft Outlook or Entourage. PocketMac can sync your contacts, tasks, calendar events, Microsoft Word documents, and email.

The software relies on Apple's iTunes application (free at www.apple.com) to enable your iPod's data storage capability and safely close the iPod's connection to your computer. PocketMac's GUI (graphical user interface; one of the most simplistic GUIs we've seen, and we mean that in a good way) handles your sync preferences. You can configure PocketMac to sync all of your PIM (personal information manager) features, or, if you

don't want to tote all of your documents, for example, you can specify individual features. By default, PocketMac pulls documents from your PC's My Documents folder, but you can specify a different directory. You can sync data manually or automatically sync whenever you connect your iPod to your computer.

PocketMac syncs your contacts and calendar events directly to your iPod's Contacts and Calendar folders and places your Word documents in the Notes folder. The Notes folder also contains the Mail folder, which houses your email.

Unless you already carry a PDA, you'll love viewing your important info on your iPod. PocketMac supports Windows 2000/XP and Mac OS 10.2/10.3. In addition to the standard PIM data, the Mac version also syncs your Stickies Notes and PDF files. The package includes both Windows and Mac versions, which means you won't need to reinvest in PocketMac if you switch from one computer to the other. PocketMac supports all iPods. ■



Information Appliance Associates PocketMac iPod Edition 1.0

\$23.41

www.pocketmac.net



GO AHEAD, LIVE DANGEROUSLY.

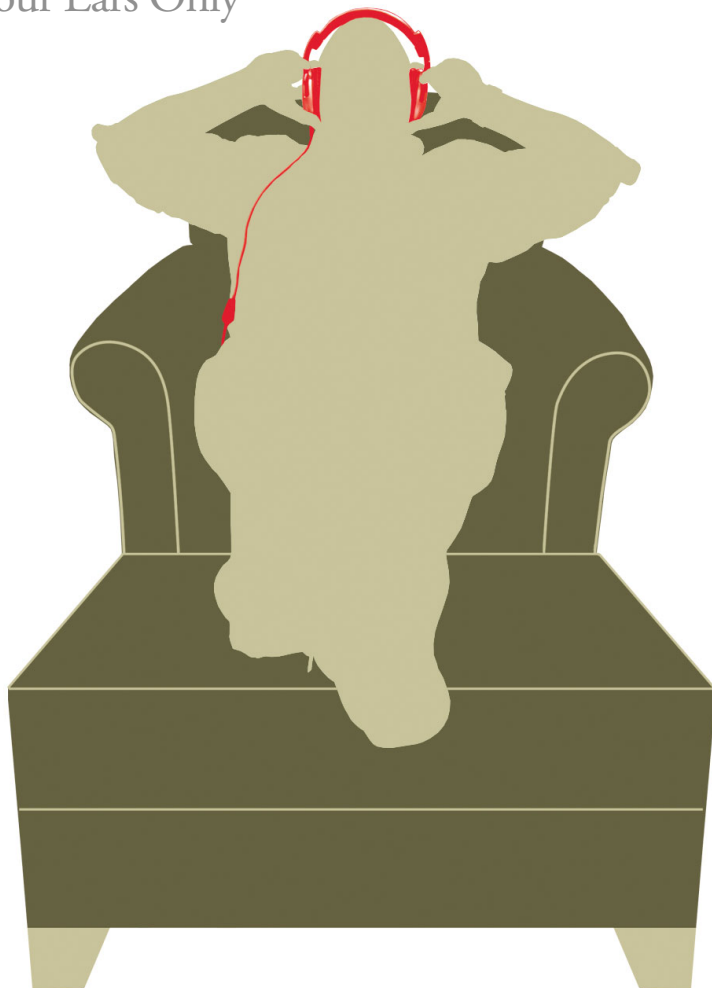
Logitech® Cordless MX Duo™. Announcing the end of tangled mice, stuck cursors and spilled coffee. With no cords to tie you up, slow you down, or hold you back, this sleek, one-touch keyboard and advanced optical mouse give you the control and flexibility to work your way – whatever the obstacles. What will you do with all that freedom?

www.logitech.com



Headphones Today

For Your Ears Only



Once upon a time in America, a young man called Phil worked double shifts at Hi-fi Buys while his friends danced mambo and drank Tequila Sunrise at local nightclubs. After many years Phil sold his high-yield municipal bonds in a bull market and applied his employee discount toward an integrated home entertainment package complete with 7.1-channel Harmon Kardon Dolby Digital surround-sound speakers, a

Bang & Olufsen BeoSound 9000 CD player, Kenwood VR-5900 A/V receiver, and a 74-inch Philips plasma high-definition television, all strung together with gold-plated twisted-pair cabling. Then, Phil put "Hey Ya" on a loop and dragged his Sharper Image shiatsu massage chair around the room until he hit upon that lonely coordinate at the intersection of sound cones where incident and reflected waves blended harmoniously into a

sublimely balanced fondue of sonorous bass, warm midrange, and bright treble: the sweet spot.

And there Phil sat, enjoying the absolute best Outkast recording in the land, as well as a pleasurable kneading sensation. But Phil hadn't reckoned on the sweet spot's magical powers, and he soon found himself completely entranced by the entertainment center's glorious acoustics. When the assistant manager from Hi-fi Buys called on Monday, Phil couldn't move to answer the telephone. When the landlady stopped by to inquire about the rent, Phil couldn't move out of his chair to get the door. When the cat started clawing at his slippers, Phil couldn't move to feed him. This went on for many weeks until one day, exhausted from malnutrition, Phil let his head slip out of the sweet spot and the spell was finally broken. But it was too late. With his dying breath, Phil whispered a single word to his remote control: "Headphones."

What Phil finally realized is that decent headphones are more than mere accessories for portable devices: they actually promise a more accurate, detailed, and intimate sound quality than speakers in the same price range—and they're always in the sweet spot. Headsets can do this because they enjoy a controlled acoustic environment: They're free of the oddball echoes and damping effects of the walls and furniture in your living room, and the manufacturer can decide exactly how far away from your eardrum to place the **transducer** (the headphone's sound-producing element). If you've never tried them before, good cans (insider's slang) may surprise you with details in your favorite recordings you never knew were there.

If you're not convinced, read on. This article will ponder the many shapes and sizes of headsets, from the boring and normal to nifty varieties such as wireless, noise-cancellation, and electrostatic technologies. Though we'll mention some exemplary makes and models in our discussion, we



Unobtrusive is the new ostentatious, and the Shure 2Cs abide.

won't make any serious attempt to review any particular headphones here, so a headphone purchase will likely require a little additional effort on your part. We approach our topic in a roundabout way: by asking ourselves exactly what kind of features some archetypal headphone users should be looking for. First up: the MP3 junkie.

The MP3 Collector

Today's MP3 devotee demands ultra-portability from her flash-based or hard-drive MP3 player, so why should she compromise on a pair of headphones? Our top recommendation for the mobile misanthrope is a lightweight, unobtrusive **intra-aural** (within the ear) headphone, or earbud: they're easy to stuff in her pocket and forget about, and she can't be faulted for style. If she doesn't mind the plugged sensation, she should skip those weak-hearted earbuds designed to nestle in the outer part of the ear in favor of the in-canal variety. (Be warned—if you're buying earbuds, pay attention to the sound when you jostle the cord; in-canal earbuds form such a tight seal within the ear that some models are plagued by lots of unwanted noise conducted up the wires. They also tend to increase the listener's experience of **occlusion**—in-head noises like raspy breathing, grinding teeth, and gurgling stomach.)

Decent earbuds such as Sony's MDR-E848LP earbuds (www.sonystyle.com) can be had for \$30 or less; top-of-the-line models from companies such as Etymotic (www.etymotic.com) and Shure (www.shure.com) deliver better bass response (problematic for tiny transducers) and excellent overall resolution, and are available in the \$100 to \$500 range.

Not into earbuds? MP3s also sound fine through **earclips** (which, not surprisingly, clip around the back of the ear) or on more traditional **supra-aural** (on top of the ear) headphones. Koss's \$49.99 PortaPro's (www.koss.com) stand out for producing great sound at an affordable price. Much sleeker than the PortaPros are behind-the-head supra-aural styles such as Sony's \$39.99 G72LPs, which won't muss the 'do and are virtually unshakeable in subway sprints. In non-earbud models, look for headphone cords that run into only one earpiece for their superior resistance to tangle and for collapsible headbands to save space.

Because portable devices can't deliver much current, you need extra-**sensitive** headphones (those with a high ratio of output volume to input wattage) to pump up the volume. Headphone amps aren't much of an option for portable device

users. Grado's SR-60 headphones (www.gradolabs.com), widely acclaimed as the best-sounding under-\$75 headphones on the market, are highly sensitive and great for portable devices, though they lose points for uncomfortable padding (the Achilles' heel of all Grado 'phones).

The Sound Engineer

Sound is money for the studio engineer, so this guy is one of the most demanding of all headphones consumers. For the sake of comfort, he'll probably prefer **circumaural** (ear-encircling) headphones for their luxuriously soft, padded cups. Koss makes some excellent circumaural 'phones (such as the Pro4AA) in the \$100 range, and the velvety-soft, lightweight Sennheiser HD-580, 590, and 600 models (\$259.95 to \$449.95; www.sennheiserusa.com) have outstanding reputations for comfort and quality.

Traditionally, circumaural 'phones have been of the acoustically-isolating closed-back variety. Newer open-back circumaural headphones such as the Sennheiser HD 497s (\$69.95) sound more natural than closed-back models and tend to put off listening fatigue longer. We generally recommended open-back 'phones where background noise is not a problem, but the studio engineer may actually need a closed-back model to limit the amount of sound leaking from the cups, which might be inadvertently picked up by microphones. (For the same reason, open headphones are a poor choice when your bunk-mate's snoozing.)

Depending on his expense budget, the sound engineer may even spring for a pair of Stax-brand electrostatic headphones (\$825 and up; www.stax.co.jp) for



Sennheiser's open-backed circumaural HD 500 marries the comfort of circumaural padding with the brighter, more spacious sound of an open headphone.

their ultra-low distortion. (The diaphragm in an electrostatic transducer is sandwiched between two parallel conducting plates and vibrates in response to a changing electric field. This design produces better linearity between input and output than is possible with most normal dynamic or moving-coil headphones, which are miniaturized versions of typical loudspeakers in which a changing magnetic field pulls on a diaphragm.)

A note here on supra-aural vs. circumaural 'phones: While you might expect that the superior acoustic isolation offered by circumaural 'phones would translate into more accurate sound, that's not usually the case. The same tight circumaural seal that blocks out background noise is responsible for a slightly muffled, canned sound as compared to open-back or supra-aural headphones. But many people can't really tell the difference or don't have a strong preference.

The Late-Night Movie Buff

The movie buff might love to shake the solarium with high-wattage woofers, but his neighbors won't be thrilled about it after 11 p.m., so headphones will have to do. Regular stereo headphones aren't going to cut it here—the movie buff requires surround sound. True surround-sound headphones have at least three transducers in each earpiece for the front, rear, and center channels, and three cords to match. Some other surround-sound headphones, such as the Sennheiser RS65 (\$209.95), include an SRS processor purporting to separate regular stereo input into a surround-sound field; this works for music, kind of, but not for movies. Zalman's ZMRS6F surround-sound headphones (www.zalmanusa.com) are low-sensitivity and a bit disappointing for

Acclaimed by many as the best-sounding 'phones for less than \$75, the Grado SR-60s are, unfortunately, not as comfortable as they should be.



audiophiles, but at \$65 the price is right. Sony's wireless MDR-DS5100 headphones are DTS and Dolby-certified and will set you back \$499.99; AKG's HEARO 999 Audiosphere IIs (www.akg.com) retail for \$1,290.

The Restless Insomniac

For midnight snacking and aimless pacing, the restless insomniac needs a longer leash than the typical 6-foot cord. Wireless headphones are the obvious choice. Reception-wise, RF (radio-frequency) headphones usually drop off long before their rated 100 to 300 feet with a wall or two between transmitter and receiver; infrared headphones need a direct line of sight from receiver to



The Bose QuietComfort 2 is the most recognizable name in noise cancellation but is by no means the only horse in town.

The Businessperson

When planes, trains, and automobiles wreak havoc on the soundstage, the business traveler reaches for her trusty

"The movie buff might love to shake the solarium with high-wattage woofers, but his neighbors won't be thrilled about it after 11 p.m., so headphones will have to do."

broadcaster and have a remote-control-type range of only 20 feet or so. On top of their propensity to cut out right during the coda of Debussy's "De Pas Sur La Nieve," and to hiss obnoxiously in the quiet part of "Twist and Shout," wireless headphones have traditionally produced inferior sound even with perfect reception, perhaps because manufacturers think of them as more gimmick than gadget. In the past five years or so, however, the incorporation of digital transmission and decent transducers into wireless headphones has worked wonders. Amphony's Model H2000 (RF) (www.amphony.com), Free-Systems' xdream (www.xdreamphones.com), and Sennheiser's RS65 headphones, priced between \$150 to \$250, all get clean reception and produce excellent sound. Watch out for interference from 2.4GHz wireless telephone frequencies, though.

pair of noise-reduction headphones. If she's frugal, she'll recall that perfectly good 'phones providing passive noise reduction have been cutting decibels for decades without fancy electronics—just a tight-fitting band and firm, sometimes liquid- or gel-filled circumaural pads. Alternatively, in-canal earbuds, such as Etymotic's top-of-the-line ER-6 (\$139) and ER-4 MicroPro (\$330), also provide excellent acoustic isolation. But seriously, who can afford to be frugal nowadays? Most likely our nomad will submit to the allure of **active noise reduction**, aka **noise cancellation**. Noise cancellation technology works by examining the surrounding environment for repetitive hums, drones, and buzzes, and then outputting opposite waveforms tuned exactly right to cancel out the noise. Because it filters out only continuous background sounds, these headphones work well in filtering out sounds from jet engines and air conditioners but don't usually do much for boisterous fans at

"The true audio snob will probably consider the mahogany-inlaid Grado RS-1s (\$695) an entry-level model."

your local soccer match. A couple of drawbacks about noise cancellation headphones worth mentioning: Active noise cancellation tends to be a little heavy on the batteries, and it also produces a faint, possibly bothersome, sensation of pressure on the eardrum.

Bose (www.bose.com) barter the noise cancellation mystique with the \$299 QuietComfort 2 headphones at upscale gadget stores, such as Brookstone. You can get a similar performance for \$49.99 with the 15dB attenuating EarHugger EH-1420NCs (www.earhugger.com), and for \$50 to \$200 from a variety of other headphones makers. Noise cancellation also comes, less frequently, in supra-aural guise (see the \$149.95

Sennheiser PXC250) and as earbuds (see Sony's \$149.99 MDR-NC11s or the Etymotic ER-6 Isolators, \$139).

The Audio Snob

The embarrassingly low \$450 price tag for the Sennheiser HD 650s being unacceptable, the true audio snob will probably consider the mahogany-inlaid Grado RS-1s (\$695) an entry-level model. If he doesn't mind mailing his firstborn to the folks at Grado, he may make a play for the new limited-edition aluminum-housed Grado PS-1s (\$1,500 or so, in Europe only). The cutting-edge VLD (Ventilated Linear Dynamic, featuring a flat-panel magnetically-driven diaphragm) technology in AKG's K-1000 ear speakers



They look like they could bring Frankenstein to life, but actually the Sennheiser Orpheus electrostatic 'phones just deliver super-detailed, low-distortion tunes.

Headphone Laws

Lest you get overzealous about your new headphone purchase and staple it to your head, we feel obliged to remind you that many states and municipalities have laws on the books prohibiting the use of headsets while riding bicycles or driving cars. As an example, Florida's Motor Vehicle statute 316.304 declares, "No person shall operate a vehicle

while wearing a headset, headphone, or other listening device, other than a hearing aid or instrument for the improvement of defective human hearing." There is no shortage of argument against headset laws by those who claim that most types of headphones (supra-aural in particular) do not block outside noise to dangerous levels, and that headsets should be

legal as long as earplugs, earmuffs, loud car stereo systems, and hearing-impaired drivers are. (See in particular biking guru John Allen's arguments at www.bikexpirt.com/bicycle/hearing.htm.) Even if you think they're no threat to your safety, wearing headphones can make your case a lot weaker if you're involved in an accident, so think twice.



The Grado RS-1s are a marvelous juxtaposition of art and technology, if not ergonomics.

(\$916) might find its way into his backup 'phones.

Naturally, an audio snob worth his salt will be hard-pressed to resist the siren song of what many will tell you are the best headphones ever made: the "legendary" electrostatic Sennheiser Orpheus, a contraption so flamboyant you need keys to turn it on. If the snob can't pony up the \$14,900 or locate one of the 300 Orpheus that rolled off the assembly line, the Internet can tell the snob how to build his own electrostatic headphones at a mere 30% risk of death by electrocution.

You

What kind of headphones do you need? That's not for us to recommend, really. But we can advise the following: Take some time to try out supra-aural 'phones, intra-aurals, closed- and open-back circumaural headphones, and noise-cancellation headphones. Jump up and down in the Radio Shack to make sure they won't fall off your head. Be sure the 'phones come with a built-in volume limiter to dampen sudden loud noises. Above all, be sure to bring a favorite disc or two to the store. If you're going to listen mostly to jazz, bring a jazz CD. The best headphones for Norah Jones are not necessarily the best headphones for Metallica. If you're going to be watching a lot of movies, bring your favorite DVD. Some headphones sound better and more natural in dialogue than they do with music. And if you find yourself seduced by those big beautiful home entertainment centers, just remember Phil. **CE**

BY RYAN TURNER

Star Wars

Satellite Radio Services Square Off

Imagine listening to the station of your choice, from coast to coast, without ever having to adjust your dial. Imagine having practically every type of music on-tap 24 hours a day, seven days a week, with no commercial interruption. Imagine never having to guess at the title of a song or the name of an artist because it's always displayed right there on your radio. Satellite radio offers all of this and more, thanks to the use of satellites instead of towers for broadcasting and the use of digital broadcasts that can carry all manner of information instead of the limited analog broadcasts used by traditional AM and FM stations.

Only two companies have FCC licenses to broadcast from satellites on the 2.3GHz S-band: Sirius (www.sirius.com) and XM Radio (www.xmradio.com), and we compared the two to see how they stack up in terms of programming, coverage, product availability, and other important areas.

Programming & Services

Both Sirius and XM are comparable in the sheer number of channels they offer, and both services have appealing variety. Sirius currently has 61 commercial-free music channels, 15 news feeds (three of which share airtime with sports play-by-play broadcasts), eight sports channels, and 21 entertainment and talk channels (four of which share airtime with sports play-by-play broadcasts). "We are going to have additional channels that will be added to the lineup midyear," says Sirius spokesperson Ron Rodrigues, hinting that



at least some changes will involve additional music channels. The service had more than 261,000 subscribers by the end of 2003, expects to have more than 1 million by the end of 2004, and predicts it will have 2 million subscribers by 2005.

XM's lineup, which was revamped throughout February and March 2004, has 68 commercial-free music channels, 11 news channels, five sports channels, and 16 entertainment and talk channels. XM is the current leader in terms of subscribers, with more than 1.5 million current customers, and 2.8 million subscribers predicted by the end of 2004. "We believe that the foundation is there for XM to reach some 20 million subscribers by the year 2010," says XM spokesperson David Butler.

For music we prefer XM because the company focuses on live programming.

XM employs more than 150 people in its programming group who work in its 80 Washington, D.C., studios, its five New York city studios, and its one studio in Nashville's Country Music Hall of Fame; it creates more than 5,000 hours of live programming each month.

"It's appointment radio," says Chance Patterson, XM's vice president of corporate affairs. "People tune in because they want to connect with our on-air personalities who are talking about what happened this afternoon, not what happened a week ago."

XM has 16 channels of traffic and weather information, with each market getting its own dedicated channel, and it plans to cover five additional markets by the end of 2004. Even those channels don't rely on canned rebroadcasts of local traffic reports. "We have our own team of traffic and weather experts on staff," says Patterson, "and we have a robust network of sources to collect all the traffic information to make sure it's accurate and timely."

Sirius also plans to offer traffic and weather information for 20 markets but alternates information for two markets on each channel. For example, in the initial feed rolled out by the company in March 2004, New York city and Los Angeles appear on the same channel, and the screen changes to let users know what market is being served at any given time.

XM's reluctance to rebroadcast local radio station content hurts the service's sports coverage, which is an area where Sirius is relatively strong. Sirius rebroadcasts NBA and NHL games and recently cut a deal to add NFL games to the mix in 2004. "Out-of-market fans will be able to receive their favorite teams no matter where they are in the country," says Rodrigues.

Neither service has many exclusive third-party channels. Each company signed some exclusivity contracts early

on, but soon after both companies agreed that they would no longer make exclusive deals with third-party content providers. "For example, with regard to the NFL, technically it's not exclusive," says Rodrigues, "but there's very little chance it will appear on XM, as well. There's nothing stopping XM from pursuing it, just as we are able to pursue what it acquires."

Sirius is the only company that offers content from National Public Radio and Public Radio International, but content is limited. Sirius broadcasts select programs such as Fresh Air, Car Talk, and Talk of the Nation on its NPR Talk and NPR Now stations, but it does not carry some of the other popular NPR programs, such as All Things Considered or Morning Edition. Schedules for Sirius' NPR channels are available at www.npr.org, and the PRI channel schedule is available at www.pri.org.

Regardless of what anyone says, the appeal of each programming lineup ultimately hinges on individual preferences. Both companies offer preview streams at their Web sites that give PC users a taste of what to expect from each station, so check the two services out for yourself or head to a local retailer for a demo.

Sound Quality & Reception

Today's AM and FM stations use analog signals that are susceptible to interference that causes static, and sound quality obviously suffers even under ideal circumstances. The digital signals used by satellite radios eliminate many of these problems; if the receiver pulls in even a weak signal, the audio comes through loud and clear. It's an on/off proposition, but occasionally a signal that appears and disappears quickly causes audio distortion.

Digital broadcast streams let satellite providers benefit from audio compression, which is a double-edged sword. Each channel uses a certain **bit rate**, which is the number of bits of data the digital data stream uses per second. Higher bit rates correspond to better

overall sound quality, but they take up a larger slice of the satellite signal's limited bandwidth. With compression, special algorithms are used that dramatically reduce the bit rate of each music stream,



Delphi's SKYFi is one of an increasing number of products designed to work both in a car and indoors; it attaches to multiple types of docking stations.

freeing up bandwidth to accommodate additional channels or to allocate to existing channels to improve their sound quality. Anyone who has ever created or listened to MP3 files knows how this works: More compression means lower bit rates, smaller files, and reduced sound quality, while less compression yields higher bit rates, larger files, and better sound quality that closely matches that of the original source material. This ability gives satellite providers the flexibility to allocate more bandwidth to music channels and less to talk radio channels, for example, and ultimately lets them carry more overall channels.

In testing, XM's channels consistently sounded better than Sirius' channels. Many of Sirius' talk and news channels sounded particularly tinny compared to XM's, and music wasn't quite as rich. Both services feature sound that is far superior to FM, however, and eliminate the hissing and other artifacts that plague radio broadcasts.

Satellite radio transmitters have potentially worse line-of-sight limitations than FM radio because the satellites broadcast using relatively small microwave wavelengths that are easily blocked by obstacles. Satellites orbit at such tremendous altitudes that many of

these line-of-sight issues are negated, but antennas need a clear view of the sky to pick up these relatively weak signals. This isn't a problem in most outdoor environments, and both services are perfect for Interstate travel, but as soon as you drive through a long tunnel, wind through a tight canyon, or even enter a heavily forested area, the limitations of satellite broadcasting become immediately apparent.

This is especially true in cities, where buildings can easily block the satellite signals. Both companies have compensated by installing terrestrial repeaters in most major markets; the repeaters intercept incoming satellite signals and rebroadcast them locally at much stronger levels. Unfortunately, these repeaters are not installed in many smaller markets, so urban reception may remain poor depending on your location. "If there is an area in which we think coverage can be improved, we may add an additional repeater," says Butler, "but currently we're working within a very large robust network of repeaters—some 800 coast-to-coast." In any case bear in mind that in most circumstances you must locate the satellite receiver's antenna near a window (sometimes a window facing a particular direction) to have any hope of receiving a signal from inside your home.

Our Sirius test radio had far worse indoor reception than our XM test radio, possibly because of the two different



XM has more than 80 broadcast studios such as this one located in its main complex in Washington, D.C.

orbits used by each company's satellites. (See the "Orbital Differences" sidebar.) In the Rochester, Minn., home where we tested the Sirius and XM products, XM signals came in strong from every window, and the antenna we'd placed in one of the windowsills was there for months without needing any adjustment. The Sirius signal came through weakly and only from certain directions, disappearing entirely at certain times of the day, presumably because of satellites moving out of view. Both services work about equally well in cars, but for home use XM may offer better reception to many users. Test both services in your home if possible before buying.

Products

Sirius' and XM's receiver units are surprisingly similar in terms of functionality; XM's receivers are generally smaller than Sirius-compatible units. All products feature LCDs that display channel, artist, title, and other information and that let users easily scroll through channels and menus. Some of the latest XM-compatible products can take advantage of the service's new TuneSelect feature, which alerts users when their favorite songs are about to be played and points them to the proper channel.

Because reception is best outside, satellite radios are in their element in automobiles. Both companies partnered with auto manufacturers for factory-installed radios. If that's not an option, you can buy an aftermarket headunit that integrates into a car's dash for a professional look. For more versatility, mobile units, such as Delphi's XM SKYFi Radio (\$99.99; www.delphi-pss.com) and Audiovox's SIR-PNP2 (\$99.95; www.audiovox.com, reviewed in this issue on page 25), have available docking kits that let users easily move the units from homes or offices to their cars.

Most car kits connect via a tape player adapter, but an increasing number of products use FM modulation instead. With this method, the satellite radio uses

Orbital Differences

Sirius and XM use different types of orbits for their satellites, each with its own pros and cons.

XM

XM's two satellites are in geostationary orbits 22,300 miles above Earth's equator. The first, named XM Rock, sits at 85 degrees west longitude, pointing at the north-to-south line running from the panhandle of Florida to Michigan. The other satellite, named XM Roll, sits at 115 degrees west longitude, pointing at the territory that runs from the borders of California and Arizona north to the westernmost edge of Montana.

Advantage: These satellites never move relative to Earth, so once a stationary receiver is locked in, it generally stays locked in.

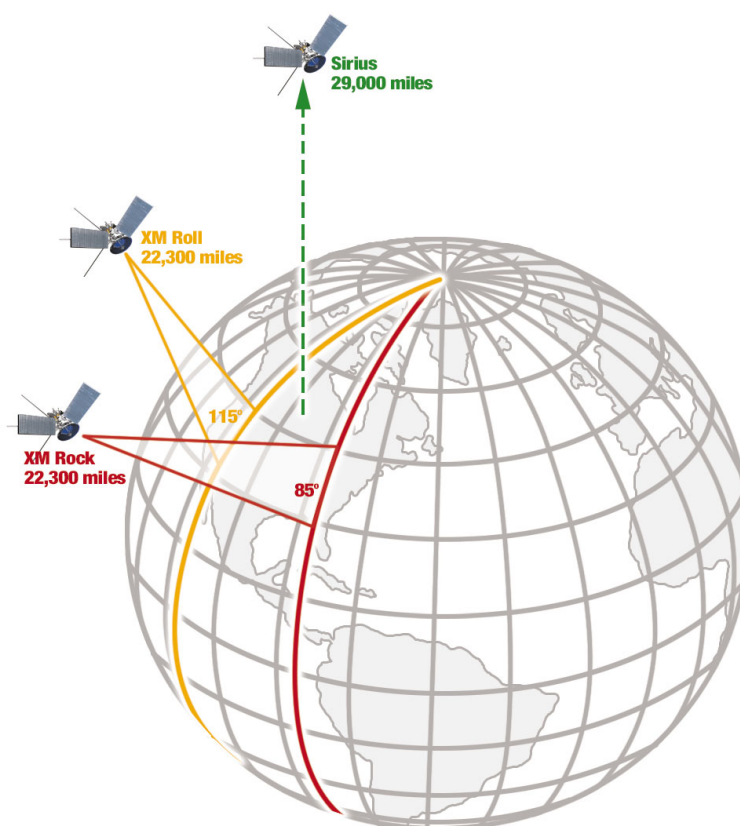
Disadvantage: The satellites are not directly above the United States, and the angle at which they must broadcast makes it easier for obstructions to block the signal.

Sirius

Sirius has three satellites that use elliptical orbits that place them more than 29,000 miles above Canada at their highest point (apogee). Because the satellites move relative to Earth, only two are within sight of the United States at any time.

Advantage: In ideal conditions, the two transmitting satellites are pointing almost directly down at the United States so fewer obstacles get in the way of the signals.

Disadvantage: Because the transmitting satellites move relative to Earth, they have the potential to drift into a position where a radio that was receiving a strong signal no longer receives any signal at all.



a small FM transmitter, and you can tune your in-dash radios to the proper FM frequency to hear audio coming from the satellite radio. Examples of products that use this technology include Terk's XM Commander (\$159.99; www.terk.com), an XM receiver (see page 24 for the review in this issue), and Panasonic's Universal System Sirius radio (\$229.99; www.panasonic.com). Remember that you have to position the antenna where it has a clear view of the sky for best reception, so putting it inside the car is not an option.

Home units range from high-end gear, such as the Antex Multizone Home SRX-3 (\$1,999; www.antex.com) Sirius receiver, to inexpensive tuners designed to work with home computers, such as the XM PC Receiver (\$49.95; www.xmradio.com/xmpcr), which uses your computer as an interface instead of

an LCD. New products are rolled out frequently, and Sirius and XM maintain updated information on them at their respective Web sites.

Both companies may legally provide service only to the United States and its coastal waters, so they don't sell receivers in Canada or Mexico. Because of these restrictions and satellite orbits, broadcasts service is not available in Alaska or Hawaii.

Prices

In addition to the initial equipment costs, both Sirius and XM charge monthly fees to access their content. Both companies offer occasional specials, but at press time, the standard charge for a Sirius account was \$12.95 per month for the first radio and \$6.99 per month for up to

three additional radios. Activating each radio costs \$5 online or \$15 by phone, and Sirius also sells lifetime subscriptions (good for the life of the receiver, not the customer) for \$499.99.

XM accounts cost \$9.99 per month for the first radio and \$6.99 per month for up to four additional radios. Activation costs \$9.99 online or \$14.99 via the phone. The company also offers several prepaid, multiyear subscription plans that discount the monthly rate. Prepaid service is \$199 for two years, \$289 for three years, \$369 for four years, or \$449 for five years.

If you plan to take advantage of multiradio pricing for either service, call XM or Sirius to activate the additional radios; don't try to activate online.

The Best Is Yet To Come

Both services plan to add new channels and services.

"The ability to expand our channel lineup is confined to our ability to improve our encoder to be more efficient," says Rodriguez. "We've done that over the past few years, and our engineers feel that we can improve the efficiency of our encoder by about 5% per year, which means that we can get about five new high-quality channels every year from our service." This improvement percentage is limited because both Sirius and XM can only make adjustments that do not affect existing hardware.

As the services mature, look for more convenience features, such as XM's TuneSelect, but remember that you'll probably need the latest equipment to take advantage of the upgrades. Pricing increases are possible, but neither company has plans to change its fee structure anytime soon. The things that won't change are those that make both Sirius and XM such great services in the first place: coast-to-coast coverage, a staggering variety of content, and an enthusiastic commitment to pleasing their subscribers. 

BY TRACY BAKER

AM & FM Go Digital

AM and FM received a technological boost with the 2003 rollout of HD Radio, which uses IBOC (In-Band On-Channel) technology from iBiquity Digital (www.ibiquity.com). HD Radio uses digital signals with enough bandwidth to potentially provide CD-quality sound to FM broadcasts and FM-quality sound to AM broadcasts. Special HD Radios are required to receive and decode the digital signals from stations that offer the service, but the radios also will receive and playback traditional analog broadcasts.

As with satellite radio, HD Radio can beam artist, track, and other information, such as text ads, to LCDs on users' radios. HD Radio

broadcasts are also on/off propositions; either you get the signal or you don't. HD Radios, however, are designed to revert to analog mode whenever the digital signal is lost. Because HD Radio uses traditional broadcasting towers, range is limited relative to satellite radio, and radio stations are not currently under government mandate to transition to all-digital formats in the near future, as is the case with television broadcasts.

Regardless, nearly 300 radio stations covering more than 100 U.S. markets and providing commercial-driven free service is sometimes touted in the media as a threat to subscription-driven satellite radio services. XM's

David Butler doesn't see it that way. "We believe that HD Radio poses no threat whatsoever to satellite radio," he says. "The primary appeal of satellite radio is the commercial-free music and the variety of programming, combined with the fact that you have coast-to-coast reception. When AM and FM radio stations make the transition to HD Radio, those advantages remain for satellite radio. AM and FM will continue to offer the same content, just with different sound quality, and as long as they continue to offer the same dull, repetitive playlist with the same heavy commercial loads, we believe satellite radio will continue to gain in popularity." ■

The Band Master

Equalizers Even The Sound Playing Field

The Equalizer" was a TV show, broadcast in the 1980s, about a former spy who would set things right for ordinary people who faced trouble from terrifying adversaries and were desperate for help. In the world of consumer electronics, an equalizer is a device that is used to set audio right. But unlike the TV hero, the audio equalizer often has the opposite effect on ordinary people: imparting desperation for help. It can be a formidable device with an unclear purpose that is full of difficult-to-master controls.

Used properly, an equalizer will improve the way audio sounds, whether the audio is a booming special effect in a movie or a rhythmic song, and whether the audio is emanating from a PC or from a high-end audio/video system.

Of course, not all equalizers are created equal. There are different types, offering different levels of help and sophistication. Nevertheless, some principles apply to all equalizers, and to use an equalizer properly, it helps to understand these principles.

What An Equalizer Is & Why Use One

"An equalizer is a device that lets you adjust the tone at a variety of points in the frequency range (of audio) to your liking," explains Chris Deutsch, west coast product and training manager for JVC (www.jvc.com). "To your liking" is the key part of his explanation. In actuality, he says, there are no right and wrong ways to adjust an equalizer.

Nevertheless, Deutsch and other experts say, there are two reasons to use

an equalizer. The first reason is to make music (or other audio) sound exactly the way it was originally recorded. The second reason is to modify the original recording.

"There should be no change in equalization based on the type of music" or audio that is playing, says Finn Arnold, director of home entertainment product development at Bose (www.bose.com). Recording engineers carefully adjust the audio in a studio with professional-level equalizers, to meet the artist's requirements, long before the audio is released in its final form, such as on a CD or a DVD.

However, Arnold notes, when you play a CD or DVD at home, the audio travels first through your stereo equipment, then through your loudspeakers, and then throughout the room, before it reaches your ears. Also, many home theater receivers and car CD players have equalizer presets, such as Pop, Rock, and Jazz, that a listener can select to automatically adjust the sound of a recording. Each of those segments can change the audio in a way that the recording engineer never intended.

For example, a subwoofer that's placed in a corner of a room at the intersection of two walls will produce more low-frequency audio (a deeper bass) than a subwoofer placed against a flat wall. And a subwoofer placed in the middle of a room (for example, under a coffee table) will produce substantially less low-frequency audio.

"Every environment you're in colors the music," says Deutsch.



A room with a wood floor and dry-wall, for example, can make music sound shrill, but heavy curtains can absorb shrillness and attenuate high frequencies, he says.

In a car, too, the environment can strongly and negatively affect the way audio sounds. For instance, the interiors of cars are small and filled with materials that reflect or absorb sound differently. Also, speakers are often placed in car doors, but the doors are not primarily designed to be acoustic cavities, Arnold notes. They are primarily built for structural integrity and to hold such things as windows, locks, and switches.

"A room can have a very large effect; a car can have a devastating effect on the spectral performance [of an audio system], that is, 'how accurately you are reproducing the intended event,'" Arnold explains.

The main purpose of the equalizer, Arnold says, is to make sure that you do hear what the recording engineer intended. The equalizer, whether it's in a home or a car, is the device that can rescue and protect the audio in those dangerous environs.

Alternatively, Deutsch says, an equalizer can emphasize a particular element in a song or soundtrack, such as vocals or a particular instrument, to make it more prominent than intended by the recording engineer.

"If your ears are happy with the end result, that's what matters most," Deutsch says.

How An Equalizer Works

Technically, even two basic controls for adjusting treble and bass meet the definition of an equalizer. These controls adjust the audible strength or decibel level of the audio at its extremes of frequency, boosting or lowering the maximum decibel level of the highest-frequency tones (treble) or the lowest-frequency tones (bass).

However, realistically, the term equalizer is understood by professionals to refer to more sophisticated devices that allow even finer-tuning of the audio, within the full spectrum of the audio frequencies that can be classified as treble, bass, and midrange, which is between treble and bass.

Equalizers subdivide the audio frequencies into bands. Each frequency band represents a range of audible notes or tones, and audio professionals call the tone that falls at the center of that range the center frequency. Some of the best equalizers let the user choose a center frequency for each band.

Effectively, an equalizer boosts or reduces the decibel level of the tones around the center frequency in the band. Professionals call this process filtering. Tones that are closer to the center frequency are boosted or reduced more than tones that are further from the center frequency. The entire distance from one end of the band to the other (the range of frequencies or tones it contains) is called the bandwidth. Thus, the equalizer filters the full bandwidth of each band in a frequency but has the greatest effect on the frequencies or tones clustered around each band's center frequency.

An equalizer can increase or decrease the amplification, or relative volume, of a bandwidth.



A real-time spectrum analyzer, such as the SA-3052 from AudioControl, measures pink noise from an audio system and displays the information graphically.

Adjustments to each band by the equalizer will subtly change the way the listener hears the notes in its frequency range. Taken together, adjustments to all the bands and frequencies will result in audible changes to the way treble, bass, or midrange are combined and will affect what you hear as the whole, for example, a song or a movie soundtrack.

Graphic vs. Parametric, Hardware vs. Software

Primarily, there are two types of equalizers: graphic and parametric.

The graphic equalizer, which is the type most people envision, features a row of sliders on its front that correspond to a number of frequency bands. The most basic, a three-slider graphic equalizer, has one slider for bass, one slider for mid-range, and one slider for treble, “barely enough to qualify as an equalizer,” says Deutsch. A high-end graphic equalizer may have 12 or more sliders, corresponding to the frequency bands they adjust, Deutsch says. When a user adjusts the sliders of a graphic equalizer, they resemble a graph that depicts the relative decibel level of each band. This is why the device is called a graphic equalizer.

The parametric equalizer affords much greater control of each frequency, over many parameters, including each band's center frequency and bandwidth. For instance, Deutsch says, a parametric equalizer may offer a choice of 13 center

frequency settings each for bass, midrange, and treble. "Depending on the center frequency you choose, the equalizer would affect different parts of the music," he says. For instance, he explains, "setting the midrange center frequency to a lower midrange frequency might be ideal to boost a deeper male vocal, whereas setting it to higher midrange frequency might be more effective for boosting a higher-range female vocal."

Some equalizers are hardware components that a user

can attach to the other components in an A/V system, such as the receiver, the preamp, and the amplifier. Other equalizers are software-based. These may be built into audio or video equipment and manually adjusted through a digital display, or offered as presets that have predetermined settings; a preset labeled Rock, for example, may have been configured by the equipment manufacturer to emphasize bass frequencies, while a Pop preset may have been constructed to accentuate vocals. (Though presets use the names of particular genres of music or other effects, their real purpose, at least in theory, is to improve the overall sound of the audio for a particular user's environment. Using the Jazz preset doesn't guarantee that your jazz music will sound better than if you used a different preset or no preset at all. It's largely a matter of individual taste.) Also, some software-based equalizers are available in the form of PC software, to adjust the quality of the audio played through a computer's speakers.

A Range Of Products For Home Or Car

There is a wide range of equalizers and equalizer-equipped devices made for home or car use, with varying levels of sophistication. In addition, there is a device, named a real-time spectrum analyzer, that one can use to exactly tailor an equalizer to his or her listening environment.

A real-time spectrum analyzer is a device that detects the amplitudes (measured in decibels) of different frequencies of sound at a particular location, and displays the results graphically, explains Tom Walker, president of AudioControl (www.audiocontrol.com), a maker of real-time spectrum analyzers and high-end home and car equalizers. It comprises a box that is positioned near the equalizer and a microphone that is connected to the box with a long cable. The microphone should be placed wherever in the room the person listening to the audio will be, Walker says.

The audio that the real-time spectrum analyzer analyzes is called pink noise, Walker says, and it is created by a pink noise generator. Most surround-sound audio receivers have a built-in pink noise generator, or it is possible to buy a DVD filled with pink noise, he says. Although it sounds like a hiss, pink noise really is all frequencies generated at exactly equal amplitudes.

Typically, a real-time spectrum analyzer costs around \$1,000, according to Walker, and usually is not something an individual would purchase. Rather, he says, dealers that sell and install home or car audio systems usually have them, and use them during the installation.

Of course, although the real-time spectrum analyzer will visibly show the effect of the adjustments made to the equalizer, the degree of those adjustments will only be as much or as little as the equalizer allows.

For homes, at the low-end of the equalizer capabilities scale is the JVC HX-Z30, a mini-system that has a three-band equalizer. A listener can adjust each band up or down 3dB (decibels). It also offers three equalizer presets, for Classic, Pop, and Rock, and three user memories to store favorite settings. The HX-Z30 costs \$450.

Home Theater Equalizers

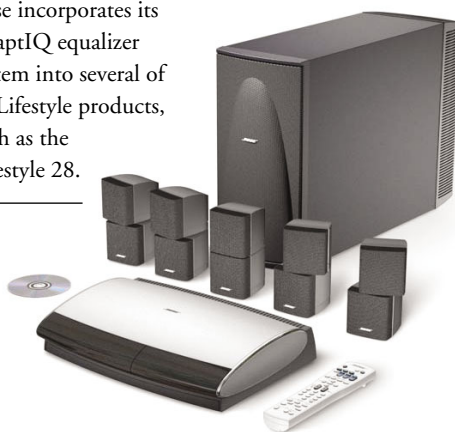
At the high end of the capabilities scale is the JVC RX-DP20VBK, a sophisticated audio/video receiver with a built-in three-band parametric equalizer that

offers 13 center frequencies each for bass, midrange, and treble. A user can adjust each band up or down 6dB. The adjustments can be applied individually to each speaker in a 7.1-channel surround sound audio system. The RX-DP20VBK costs \$2,499.95.

Also at the high end of the capabilities scale is the AudioControl Bijou Home Theater Room Equalizer, which lets a user set equalization levels individually for all of the speakers and the subwoofer in a 7.1-channel surround sound audio system. The Bijou is able to boost or cut frequency levels across 30 bands of bass, treble, and midrange. It is a graphic equalizer, and it costs \$1,199.

In a home theater setting, notes Deutsch, it's desirable to adjust the equalizer for each of the speakers: left and right front, left and right rear, left and right sides, front center, and subwoofer because each is in a location that will affect the quality of its audio output differently. For example, the

Bose incorporates its AdaptIQ equalizer system into several of its Lifestyle products, such as the Lifestyle 28.



subwoofer may be on the floor against a wall while the rear speakers may be mounted in or on the wall.

A system from Bose called AdaptIQ takes equalizer setup even further, says Arnold. Using a digital signal processor chip, the AdaptIQ system adjusts an equalizer for each speaker and subwoofer for listeners at multiple locations throughout a room, not just the one location covered by a real-time spectrum analyzer, Arnold explains.

The AdaptIQ setup procedure requires the user to wear a headset with a

pair of microphones built into it and to move from location to location in the room according to a procedure dictated by the system. As the user moves around the room, the microphones listen to audio generated by the AdaptIQ system through each speaker and the subwoofer, and the system automatically adjusts the equalizer. The brains of the system is a DSP (digital signal processor) chip built into the receivers included in Bose's Lifestyle home-theater-in-a-box packages. The receivers feature AdaptIQ. The packages range in price from \$2,500 to \$3,000.

"With DSP, the detail one can apply to equalization now is phenomenal," Arnold says.

Of course, it's also possible to use a real-time spectrum analyzer in multiple locations throughout a room to take multiple readings and devise a compromise setting. "Adjusting for multiple locations is a tradeoff," Walker declares. "The tradeoff is you can make it sound

pretty good in multiple locations or, if you usually are in one particular location, you can make it sound spectacular in that one location."

Similar levels of sophistication are available in equalizers for cars.

For example, JVC sells the KD-AR3000, a car stereo with a built-in seven-band equalizer, which offers controls for two bands of bass, three bands of midrange, and two bands of treble frequencies. A user can adjust each band up or down 5dB. There are three

user memories and nine equalizer presets for different types of music. The KD-AR3000 costs \$299.

AudioControl sells the DQS, a DSP-based equalizer that offers control over 192 bands and also features parametric capabilities. The DQS costs \$599.

"Equalization is about getting spectrum correct," Arnold advises. "Think of a choir. You don't want some singers louder than others. You want the spectrum smooth." 

BY ROBERT E. CALEM

CE DEJARGONATOR:

Artifacts

Archaeologists may delight in finding artifacts, but they are the absolute bane of consumer electronics aficionados. Artifacts infiltrate both audio and video files and come in the form of unwanted noise, static, graphical garbage, or other glitches that distort the purity of the original signal.

Some artifacts are avoidable and accidental: Someone may have used improper settings during a recording or broadcasting session. For example, setting a potentiometer (usually called “pots,” **potentiometers** are the dials used at TV and radio stations to adjust the sound levels of signals that are mixed and broadcast) too high when a concert is recorded leads to audio that sounds distorted when played back. Electrical interference near cable lines can also introduce static into a signal.

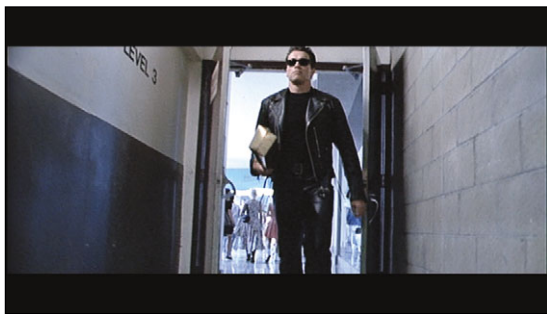
The most common artifacts are caused by compressing a digital signal to reduce its file size and are called compression artifacts. On the audio side they show up as pops, hisses, and tinny sounds when CD-quality audio is converted to a compressed format, such as MP3.

Digital video services, such as digital cable and satellite television, also exhibit a host of artifacts that stem from compression. Banding happens when color fidelity is reduced to the point where smooth color transitions dissolve into bands of color with hard edges that make images resemble topographical maps. Banding often affects dark areas of compressed images and videos where there are a lot of shadows. Ringing and haloing are caused by signal problems or overzealous DVD edge-enhancement and cause duplicate edges to appear around the edges of objects. Noise appears as snow or

other random graphical glitches and has a variety of causes.

There are many more examples of audio and video artifacts, but it is important to note that some problems are introduced by your playback hardware and have nothing to do with the purity of the incoming signal. Poor bass reproduction may stem from cheap speakers or headphones, for example, and distorted geometry on a TV screen (circles that appear squashed, curved screen edges, etc.) most often are caused by flaws with the television tube or other components. Run a variety of audio and video from different sources through the problematic hardware if possible to determine if artifacts are the result of a faulty signal or if your hardware is to blame. **CE**

BY TRACY BAKER



Ultimate Edition DVD is rife with ringing artifacts, as demonstrated by this picture. Look at the light-colored “halos” that run along the edge of Schwarzenegger’s jacket (especially the arm on the right), along the wall on the left between the green and white paint, and outline nearly every other surface in this image.



Noise results from interference or other unwanted information that bleeds into a signal. It generally is heard as static in audio signals and shows up as random dots of color like this in video feeds. The image on the left is the original source with no noise, while the one on the right shows how noise robs images of detail and color.



Out Of The Box

Join The TiVo Nation

If you were to cross a VCR with a computer, you might just end up with a TiVo DVR (digital video recorder). Although DVRs haven't enjoyed the overwhelming popularity of DVD players, loyal users are slowly spreading the word. Unfortunately, setting up a TiVo can be a complicated procedure, depending on your circumstances. To help fulfill TiVo's promise of "TV your way," we've assembled a guide to help you set up and enjoy your new DVR.

What's In The Box?

As you unpack your TiVo, inventory all of the items, making sure you don't misplace a component. TiVo units typically ship with a remote control, a pair of AA batteries, several manuals, a series of cables, and, of course, the TiVo unit itself. This should be enough to connect your TiVo to your television. However, certain configurations may require you to purchase additional hardware to get the most out of your TiVo. We'll discuss additional hardware requirements in each of our scenarios.

VCRs have gone the way of the buggy whip with the advent of the TiVo.



Choose A Connection

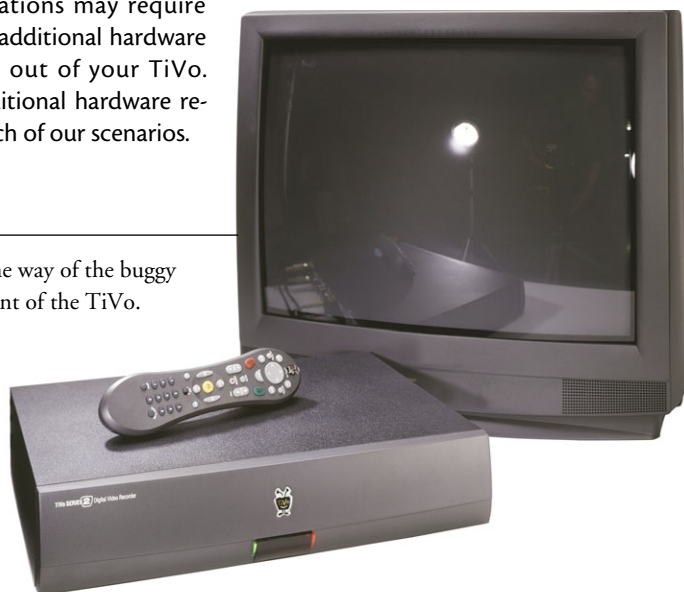
Once you've unpacked your TiVo, take a look at its back panel. Most TiVos have a detachable power cord and a series of labeled connectors for integrating with your TV and other audio/video components. We'll use our Series2 TiVo as a reference throughout

our guide, but you shouldn't have any trouble with different units.

Moving from right to left, the first connectors you'll see on the TiVo are a pair of USB inputs, used for connecting the TiVo to a home network. You can use these inputs for both wired and wireless networks. If you connect your TiVo to a home network that has Internet access, you can avoid tying up your phone line when you're downloading program guide updates.

You'll use the next pair of inputs when the TiVo is connected to a cable box or satellite receiver. One is labeled Serial and the other IR (infrared). If you're using a DirecTV satellite receiver or a Motorola/GI DCT2000 cable box, you may be able to use the serial control cable (included with the TiVo) for channel changing. All other set-top boxes will use the IR control cable, which also ships with the TiVo.

Next, you'll find an RJ-11 phone jack that you'll use to connect the TiVo so it can download program guides. You'll need to use a phone connection during the initial setup, but afterward you can



use an Internet connection through the USB ports as we mentioned previously. TiVo includes a 25-foot phone cord and a phone line splitter. When connecting your TiVo to the phone system, remember that the phone line needs to be a standard analog line. Using a digital PBX (private branch exchange) line as is often found in hotels or office buildings may damage your TiVo.

The next connectors are the signal outputs for the TiVo. The first is an S-Video connector. TiVo units do a respectable job of preserving picture quality, but there are some steps you can take to ensure that you're viewing the best possible picture quality. The most important is to use S-Video cables whenever possible. Although HD TiVo

and as previously mentioned, we recommend using S-Video if possible.

Rounding out the TiVo's back panel are RF (radio frequency) coaxial inputs and outputs for cable or antenna signal sources. These use a fairly rigid RG-6 cable with a small inner wire and thread onto the connector. Next to them is a small switch for selecting the channel setting on your TV. Typically, you'd set your television to either channel 3 or channel 4, and the TiVo displays the channel you select on one of these settings. Your TiVo includes a coaxial cable.

Activate Your Account

Now that you're acquainted with the TiVo's back panel, it is time to start



The Series2 TiVo has a clean, clearly marked back panel.

units are being introduced, most TiVos are standard definition. If your television has S-Video inputs, S-Video will give you the highest possible picture quality. The TiVo doesn't ship with S-Video cables, but you should be able to find them at your local electronics store.

If your television doesn't have S-Video inputs, your next best option is using the TiVo's composite connectors. The TiVo has two composite outputs, easily identified by their yellow color. Above these two outputs are two sets of stereo outputs. If you're using the composite connectors, you can output the TiVo signal to two A/V components. The TiVo ships with a 6-foot, three-wire composite cable for all three outputs.

Continuing to the left, the next connectors manage the input signals from a cable or satellite broadcast. The TiVo features S-Video and composite connectors,

setting up the system. First, you'll want to activate your TiVo account. To do so, you'll need the TiVo service number. This is a 15-digit number located on the back panel next to the power inputs. Write down this number, and you're ready to activate your account.

You can activate your account in two ways. The first (and preferred method) is through TiVo's Web site (www.tivo.com). On the left side of TiVo's home page, look for the Activate Or Upgrade Your TiVo Service link. Click the link and follow the instructions. If you don't have Internet access, you can call TiVo's Customer Support (877/367-8486) to activate your TiVo.

TiVo requires either a monthly subscription of \$12.95 or a one-time fee of \$299. If you think you'll use your TiVo for more than two years, the second option is the better bargain. One word of caution though: The lifetime fee is

nontransferable. If for some reason you replace your TiVo, you can't transfer your lifetime enrollment to a new unit.

Common Scenarios

TiVo is a flexible system, and you can integrate it into your A/V system in myriad ways. We can't cover each possibility, but instead we'll focus on steps you're most likely to encounter. How you use your TiVo depends on the source of your TV signal, as well as the A/V components you have. Before you attempt to connect your TiVo, take a moment to review our sample scenarios.

Antenna/analog cable. For many users, the TiVo will act as an "intelligent" replacement for the VCR and as a channel "tuner." In this setup, the TV signal is delivered to your house through either an antenna or an analog cable service. These signals usually arrive over an RG-6 coaxial cable. This is the simplest configuration for TiVo and will allow you to watch one channel while recording another.

First, turn off and unplug your TV. Take note of the A/V connectors on the back of your television. Your television should have a coaxial connector and may have composite connectors, S-Video inputs, or even component inputs (which a standard definition TiVo does not support). If your TV has only one input (usually a coaxial connector), you won't be able to watch one channel while recording another.

Next, connect an RF splitter (available at most electronics stores) to the coaxial cable that provides your TV signal. Connect one RG-6 cable to the splitter and the coaxial connector marked RF IN on the back of your TiVo. Connect a second RG-6 cable to the splitter and the coaxial input on your television. Now, connect the TiVo to your TV using the appropriate cables and then connect your TiVo to a phone jack. Finally, plug in your TiVo and your television and turn on your TV. You can skip the next four paragraphs and proceed to Guided Setup.

Satellite/digital cable. If your TV signal comes from either a satellite receiver or digital cable set-top box, your setup is a bit trickier. If you use a satellite receiver or digital cable box, you can't just change channels and program for recording using TiVo's remote/tuner because it can't decode these signals the way it can decode signals from a standard cable/antenna line (as in our first setup example).

However, the good engineers at TiVo have provided several workarounds for this situation.

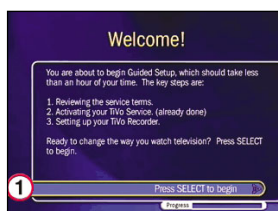
First, turn off and unplug your TV and set-top box. Take note of the A/V connectors on the back of your television. Your television should have a coaxial connector and may have composite connectors, S-Video inputs, or even component inputs (which standard definition TiVos don't support). If your television has only one input (usually a coaxial connector), or you're using a satellite receiver, you won't be able to watch one channel while recording another.

If you have a satellite receiver or cable box with serial control capability, connect the control cable from the Serial connector on the receiver to the Serial connector on the TiVo. Otherwise, connect the IR control cable to the IR connector on the TiVo.

Next, connect your set-top box to the TiVo with your choice of cable. Again, our recommendation is to use S-Video if at all possible. Make a second connection, this time from the set-top box to your television. You'll use this connection when you want to watch one show and record another. Now, connect your TiVo to your television and plug your phone line into the TiVo. Finally, plug in your TV and set-top box and proceed to Guided Setup.

Guided Setup

With your TiVo properly connected and your television on, a Welcome screen



Configuring your TiVo is easy with the well-designed on-screen menus.

will greet you and walk you through the process of configuring your TiVo. This on-screen process (referred to as Guided Setup) takes approximately one hour.

After Guided Setup finishes, you'll be able to use most of TiVo's functions, such as pausing, rewinding, and fast forwarding. Your TiVo will then take several more hours to organize the on-screen program guide that lets you search for programs and schedule recordings.

TiVo In Use

Now that your TiVo is set up and configured, it's time to put it to use. Although there are many options for using your TiVo, some of the more common are recording a TV show, recording a series, and watching something on one channel while recording a show on another.

Recording a show.

The first thing that most new TiVo users try out is simply recording a TV show. TiVo automatically records whatever you are watching for up to 30 minutes. This buffer is what lets you rewind, fast forward, and pause a program.

If you want to record the entire program, follow these steps. First, select your show either by using the Channel Up/Down button or from the Program Guide. You can access the Program Guide from the Guide button on your TiVo remote. Navigate through the Guide using the arrow buttons until you find your TV show and then press Select. A description of the TV show replaces the Program Guide; press Select again to start recording the show to TiVo's hard drive. You can also record a full episode. When you're ready, press the Record button on your remote.

When you choose to record a show, you'll be prompted on-screen for recording settings. You can modify these settings by using the right/left buttons on your remote. One thing to keep in mind is that TiVo can only record one show at a time. You can watch a prerecorded show while you're recording another show, but to record multiple shows concurrently, you'll need to buy a second TiVo.

Recording a series. When you record a TV show, TiVo gives you the option of recording what's known as a Season Pass. If you select Season Pass from the on-screen menu, TiVo will record each episode of the show for the current season. Simply select the show from the program guide and choose Get A Season Pass.

Viewing shows you've recorded is simply a matter of using TiVo's Now Playing feature. To access Now Playing, press the TiVo button on your remote twice. Now Playing will display all of the programs you have recorded. Highlight the show you want to watch and press Play. You can also manage programs you have recorded in Now Playing by highlighting them and pressing Select. You'll be able to modify retention settings, transfer to VCR, or simply play the shows.



Want to catch every episode of your favorite show? Use TiVo's Season Pass feature to make sure you never miss a show.

A Slice Of Time

Although it may seem complicated, setting up and using a TiVo is a fairly easy process. Thanks to TiVo's excellent setup manual and a few pointers from this article, you'll have your TiVo ready to record, fast forward, or replay long before the season-ending cliffhanger. Put the rest of the world on pause, kick off your shoes, and catch up on your favorite TV shows. 

BY CHRIS JACKSON

Sights & Sounds

From Here To Infinity

They are, without question, the cruelest pages in this magazine: the monthly “Extreme CE—If Money Were No Object” feature. This was made brutally clear in our very first issue last December. I still remember the shock and awe: \$90,000 German speakers. I don’t recall if that was per pair, or per speaker, and don’t have the heart to check. It’s irrelevant, anyway. If you don’t blink at \$90,000 for speakers, you can haul home as many as you want.

I’m sure they sound divine. I’m sure I’ll never know. What I really wonder, though, is if they sound \$89,400 better than a very respectable pair of Infinity Primus 360 towers (www.infinitysystems.com), which you can bring home for a far less stratospheric \$600 or so.

Somehow I doubt it. If you’re in the market, with an under-\$1,000 budget, these black monoliths are worth serious consideration.

Sound Choice

Auditioning speakers in one of the Soundtrack electronics chain’s listening rooms could hardly be more convenient. After the doors shut on the main showroom and its Nuremburg Rally of TVs, it’s just you and the speakers. And the sales rep, who uses a small control console to toggle between the pairs you wish to hear, so you can make all the A/B comparisons you need.

Conventional wisdom has long said that if you’re speaker shopping, you should make your comparisons using acoustic music. Its sound is relatively spare, but airy and natural, so there’s not a lot of sonic clutter. That makes it easier to focus on just a few details while making critical judgments from speaker to speaker. To that end, I’d brought a



Rivethheads rejoice: With its black grille in place, the Infinity Primus 360 resembles lots of other speakers. But pop off the grille, and you’ll reveal a fastener-studded faux-metal-plated industrial design that looks as cool as it sounds.

CD of solo cello by Yo-Yo Ma, but my feeling is that you may as well also bring a more widely representational range of your listening habits, so along came one of Steve Roach’s spacious ambient soundscapes and some rampaging bottom-heavy industrial metal.

In a rotational face-off, the Primus 360s pretty much toasted everything else within the same price range and even beyond. They simply sounded more “there.” The cello was rich, full, and alive; the stereo imaging of the soundscape was three-dimensional enough to step into; the metal hit like a wrecking ball. I even preferred the Primus towers to a pair from Klipsch.

Not because they sounded better—tough call, there—but because the Klipsch’s horn-enclosed tweeters made their sweet spot noticeably narrower.

Final budget stats, for the pair: List price \$659.98; store tagged at \$599.90; ultimately paid \$551.90. You can do better online, but shipping for two 50-pounders will erode part of the savings. And in this case, it would’ve been bad karma to take my business elsewhere and stiff the guy who’d genuinely worked to earn it.

The Two Towers

These speakers replaced a pair of old-timers that finally shook themselves into disintegration, and I’m expecting the Primus 360s to last a long time. They’re built like battering rams, with tough speaker cones made of anodized aluminum. For their receiver connections, the speakers employ thick, screw-capped binding posts instead of flimsy clips.

As you can tell from the photo, the 360 is a three-way speaker, with separate low-, mid-, and high-frequency drivers. For the extra hundred dollars, it sounded much fuller than its two-way little brother, the Primus 250. The 360s handle up to 200 watts, so you’d likely go deaf before overdriving them. The dual 6.5-inch woofers pump out plenty of tight low end, but with a frequency range that bottoms out at 38Hz, there’s room for a sub if you need the low-lows.

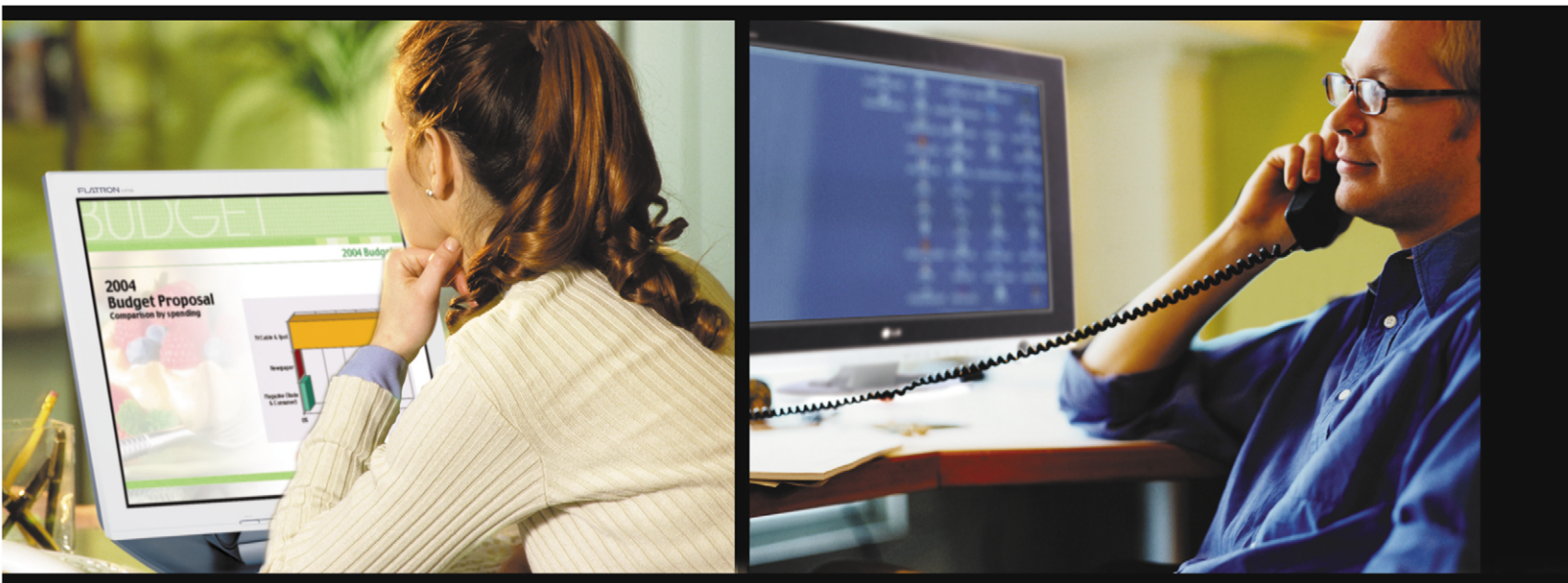
The Primus 360s would make a monster pair of front speakers for a home theater, particularly if you listen to music on the same system. Infinity’s Primus line also includes smaller surround speakers (the 150), a center channel (the C25), and a subwoofer, so it’s easy to put together a matching set.

In the end, I couldn’t be happier with these. And although I know, in the back of my mind, that those \$90,000 German speakers are out there snickering sublimely, I’m not losing sleep over it.

Although the neighbors might. **CE**

BY BRIAN HODGE

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The Future Calls

The United States Goes Wireless

The wireless century has begun. Around the world, more than 1 billion people tote wireless phones; here in the United States, 148 million phones battle for airwaves. For the first time, we are spending more on wireless bills than long distance (according to the Telecommunications Industry Association), and this year, Americans rated the cell phone the most annoying, necessary invention on earth (in a survey by the Lemelson-MIT inventors' program).

Here's another way to look at the changes wireless phones have wrought: Think of the classic dramas that could never have happened in the cell phone age. At the end of "Romeo and Juliet," a quick text message could have stopped her from downing that poison. How about those legions of horror movies where victims realize the lines are cut, so they're cut off?

(To moviemakers' creative credit, the 1997 horror flick "Funny Games" has the murderers dunk a victim's cell phone in the sink.)

Cell phones let us decide whom we want to talk to and when we want to talk, in a way no other technology has. That's a big deal, says Ellis Godard, a sociology professor at California State University-Northridge who studies wireless society.

"We can now shape all of our interactions with anyone, anywhere. Whether that's a strategic opportunity or a cultural time bomb is something we'll only know in hindsight, decades from now," Godard says.

The cell phone craze has even surprised some experts. Tole Hart, a principal analyst at research firm Gartner, has been following the industry for seven years. Phone users have taken even more to yakking than anyone thought they would, Hart says.

"I think if you look at it now [through 1997 eyes], I don't think you'd think everyone would be talking as much as they do, that [cell phones] would be that prevalent a technology," Hart says.

Toward A Wireless Society

Jacqueline Whitmore is on the front lines of the new wireless society. A professional etiquette expert in Palm Beach, Fla., she teaches wireless etiquette—where and how to make calls so as not to annoy others. Whitmore says Americans are "more aware than they have ever been" of the social rules around using cell phones. Time has helped, as has technology. Text messaging, she says, is a great way to get information across without bothering others.

One of Whitmore's top rules is that "the people you are with should take precedence over calls," demonstrating that people are still figuring out where cell phones fit in their social worlds: Is a call like bumping into a friend on the street, is it an urgent message demanding response, or is it something (like an email) that can often sit for a while?

Godard says the development of cell phone etiquette is how societies assimilate new technologies. "Novelty annoys routine and then becomes routinized," he says. "Technological diffusion takes a

few decades, but wireless phones are about that old."

Whitmore and Godard agree that cell phones help us maintain social bonds in an increasingly mobile society. "We have families working late, we have neighborhoods that aren't really neighborhoods any more, . . . [and] we don't get to develop the relationships we used to develop," Whitmore laments. Give Mom, Dad, and the kids phones, and everybody can check in with each other.

Wielding cell phones in our busy 21st-century lives lets us stay in touch with our friends and family, Godard says, but even that has a price. Cell phones let us plan and program our highly structured lives, potentially blocking out new, random encounters.

"We're less likely to meet new people, even while we're being more mobile. The cost of closeness to those we already know is distance from those we could otherwise meet."

Power In Your Hand

Most Americans aren't into sociological speculation. They're into safety and convenience—the No. 1 and No. 2 reasons people buy mobile phones, according to Travis Larson of the CTIA (Cellular Telecommunications & Internet Association).

Safety, convenience, and advancing technology have driven mobile phones from a few subscribers in Chicago in 1983 to more than 148 million today. Americans sign up for new phones like gangbusters, and they're going to continue to do so for at least a few more years, says Charles Golvin, wireless analyst for Forrester Research. Right now, about 64% of U.S. households have wireless phones. The market will probably top out at around 77%, Golvin says, though a lot of the new growth may come from



The Motorola DynaTAC was the United States' first mobile phone. Introduced in 1983, it cost \$3,995 and weighed a little less than 2 pounds.

harder-to-reach folks such as the elderly, low-income families, and kids.

Keeping the new subscriptions coming is important to carriers, who've yet to see a bad year. In 2003, cell phones were an \$81 billion dollar business, up from only \$29.6 billion five years before—and from a mere \$354 million in 1985.

In Europe, they've hit the saturation point. A spin off of cell phone firm Siemens, Xelibri (www.xelibri.com) focuses on selling second and third phones to people. In Xelibri's world, Europeans change their everyday phones for stylish fashion-phones when they head out for the evening, and that could be our future, too.

New subscribers talk longer than ever

for less money per minute than ever, using phones that are smaller and cheaper than ever. The original cell phone, Motorola's DynaTAC, had one hour of talk time and eight hours of standby, weighed 28 ounces, and cost \$3,995.

Nowadays, many phones weigh in at around 4 ounces, with several days of standby time and at least two to four hours of talk time. They may have built-in cameras, play video games or MP3s, and/or keep your calendars, contacts, and email.

A new law lets subscribers keep their phone numbers when they switch carriers, but they generally can't keep their phones; handsets are locked to work only with one cellular company. Combine that with the continual release of newer, cooler, and better handsets, and you have a techno-trash problem.

New problems bring new solutions. In this case, ReCellular (www.recellular.com), a company that specializes in recycling and reselling old wireless phones. It deals only with businesses, though. If you want to "recycle" your phone, go to www.wirelessrecycling.com to find a database of charities you can donate an old phone to. Some distribute phones rigged only to dial 911 to groups, such as the elderly and battered women, sending safety and convenience to the Americans most in need. Remember to delete your saved info (phone books, text messages, etc.) before you donate your phone.

Get Networked

The original cell phone network was spotty and staticky. For years, if you traveled too far from your hometown, your cell phone service would stop or you'd be charged outrageous roaming fees.

Today, most phone users belong to one of four 2G (second-generation) digi-

tal camps: CDMA (Code-Division Multiple Access; championed by Verizon, Sprint, and Virgin Mobile), GSM (Global System for Mobile Communications; Cingular, AT&T, and T-Mobile), iDen (Integrated Digital Enhanced Network; Nextel and Boost), and TDMA (Time-Division Multiple Access; on its way out). Digital networks provide clearer calls than analog and let carriers tack on extra features, such as pictures, video, and text messaging, and location based services that send you information (such as shopping coupons) based on where you're standing.

CDMA, GSM, and iDen are all about the same quality, and none of the three is going away any time soon, Golvin says. But there is a difference between carriers. Research firm JD Power & Associates rates Verizon's and Nextel's



Twenty years later, the Motorola v400 weighs 4.3 ounces, has a built-in camera, and costs \$299.

Many phones are even offered free with certain plans.

coverage and reception best nationwide; T-Mobile is at the bottom of the pack. Sprint led the way with picture messaging, and Cingular offers **rollover** plans where unused minutes don't just get thrown away at the end of the month.

Verizon's and Nextel's networks may be best, but no network is perfect. CTIA's Larson says lousy reception is users' No. 1 complaint. Cellular dead spots so irritate New Yorkers that late last year, the city government started tracking problems and publishing them on the city's Web site. (On the city's map, midtown Manhattan is a livid red welt of dropped calls.) Larson says mobile carriers are working hard to improve reception. "We build 50 new cell sites, on average, every day and have been for the last five years," he says.

Roaming has now gone international. Because GSM is a global standard, Cingular, AT&T, Nextel, and T-Mobile all let subscribers with certain handsets travel to dozens of countries and still make calls (at sky-high roaming rates). Thanks to a new Samsung handset, Verizon users will soon be able to join the globe-trotting crowd. (Verizon and Sprint phones already work in a few foreign countries, including Canada and Mexico.)

The rest of the world is more charged up about cell phones than Americans. Worldwide, more than 1 billion people now own wireless phones—about one in six humans on Earth.

In Europe, a unified network technology (all European carriers are GSM) and fewer wide-open spaces meant companies could build their cellular networks quickly, and expensive landline phone calls pushed millions to wireless. In Latin America and the Caribbean, many people who'd never had a telephone are making their first calls using prepaid wireless phones, says Chris Pearson, president of 3G Americas, a wireless trade group. And in the Philippines in 2001, President Joseph Estrada was thrown out of office in part

by a massive public demonstration organized through wireless text messaging.

Words, Pictures & Movies

Analysts are clear: It's time to shut up about talking. The new wave in wireless is camera phones, videophones, music phones, and text messaging. Nearly one-fourth of all wireless phones sold in 2004 will be camera phones, according to research firm InfoTrends, and, by 2006, more than 80% of phones shipped in the United States and western Europe will

data networks are pretty much becoming ubiquitous," he says. That means not just fast Internet access, but the ability to send music and movies over phones.

These high-speed networks come in two varieties. The first, 2.5G (second and one-half generation) includes technologies, such as GPRS (General Packet Radio Service) and CDMA 1xRTT (marketed by Verizon Wireless as "Express Network" and Sprint PCS as "PCS Vision"), and offers speeds around that of landline modems—good for pictures but too poky for video. But the new 3G networks called EDGE (Enhanced Data for GSM Evolution), EVDO (Evolution Data Only), and W-CDMA (Wideband CDMA) being built now boost you to at least double or triple those speeds, so sending video becomes possible.

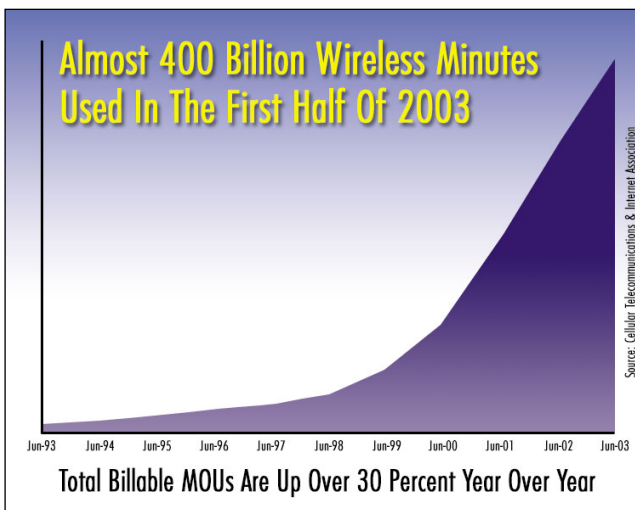
Text messaging doesn't require high-speed networks, but it's taking off here after years of false starts. The main problem is that many people don't know if their phones or plans support text messages, says Forrester Research's Golvin. (Almost all phones

do, but many plans don't.)

With aggressive sales of camera phones, wireless bills are increasing after a 20-year decline. The money, analysts say, isn't being spent on talk-time minutes, which are cheaper than ever, but on sending pictures and downloading games. "Some carriers are reporting close to 20% of their revenue in wireless data services," Pearson says.

That desire for data-driven dollars will drive even more fascinating services in the future, analysts say. Already, in Europe and Asia, they're making full-fledged video calls, taking print-ready photos, and even paying for pizzas and Cokes using their phones. Like any good conversationalist, the firms behind wireless phones know how to keep you listening and are sure to try to keep you on their lines. **CE**

BY SASCHA SEGAN



include cameras, according to research firm Gartner. In Japan, camera phones have hit 2MPs (megapixels), which is good enough for photo-quality 4- x 6-inch prints.

"Carriers are constantly looking to move phones away from just voice and more toward miniature computers," CTIA's Larson says. "There are gaming phones, such as Nokia's N-Gage, and phones focused on music that let you play MP3s and listen to the radio."

The most powerful phones, called smartphones, are miniature PCs. Looking nothing like Qualcomm's 1999 bricklike models, smartphones, such as palmOne Treo 600, sport full keyboards for writing emails, big screens, and color Web browsers. Or, like Motorola's MPx200, smartphones can be slim flip-phones that run a subset of Microsoft Windows.

New networks make the services possible, Pearson says. "High-speed wireless

Floating On Air

How Wireless Phone Technology Cut The Cords

Wireless phones have become a ubiquitous, almost invisible, part of our lives. We rarely stop to consider how these marvels of telecommunications technology work at all, let alone work reliably and around the world. What's the difference between the carriers, anyway? Is it just a branding battle, or do technology differentiators matter? And what's this "SMS" thing? What's the deal with camera phones, network phones, and smartphones? We'll answer all these questions and more in this brief whistle-stop tour of wireless phone technology.



each frequency into three time slots. Each call receives a 30MHz piece of spectrum one-third of the time. TDMA supports triple the call density of FDMA technology. The widely used GSM (Global System for Mobile Communication) standard operates on TDMA technology.

GSM is an open system used by several carriers (including Cingular, AT&T Wireless, and T-Mobile); it's the most common mobile standard worldwide. Nextel operates a version of GSM called iDEN (Integrated Digital Enhanced Network). It applies TDMA technology in a specific way (encrypting trans-

Standards

Wireless begins and ends with just one word: standards. Almost by definition, any network of communications devices relies on common standards. Such standards enable and interpret all the various interactions required to send a signal from one place to another. And the wireless world is chock-full of standards, starting with the various technologies that carry voice signals from one phone to another.

All wireless communications stem from the good old-fashioned radio. In fact, the first mobiles were simple radio telephones installed in cars, connecting to powerful central transmitting towers. Scattered local receiving sites sent the car's low-power signal back to the central tower. Southwestern Bell initiated the first such system in St. Louis in 1946, with half-duplex technology (presaging push-to-talk and Dennis Franz commercials by more than 50 years). These sites

were the precursors to modern cells, each covered by a single transmitter.

The various wireless standards primarily involve different ways to divide each transmitter's available space on the radio spectrum. The first generation of wireless standards was FDMA (Frequency Division Multiple Access). FDMA carries each call on separate, dedicated pieces of the spectrum separated by 45MHz bands (to prevent interference). AMPS (advanced mobile phone service) is an analog standard using FDMA technology to provide near-universal roaming access for out-of-area digital technologies. When your phone enters an analog roaming area, it's most likely reverting to AMPS.

GSM

The second wireless generation, TDMA (Time Division Multiple Access), applied digital technology to compress voice data. As a result, TDMA can split

missions, for one thing) and operates in a variety of spectrum ranges.

European and Asian GSM systems transmit in the 900MHz and 1,800MHz bands, while American GSM systems transmit in the 1,900MHz band. GPRS (General Packet Radio Service) is a companion standard to GSM, designed to carry data (non-voice) signals more efficiently. Materials often reference the two together, listing a phone or service as GSM/GPRS compatible.

One advantage of GSM is its potential usability across international borders, but you need a dual-band or tri-band phone to make that portability possible. Interchangeable SIM (subscriber identification module) cards let you access various GSM service providers. Bandwidth has been one of the standard's primary limitations, and the future growth of data and media-rich mobile services relies on new technologies to increase transfer speeds and data capacity. 3G (third generation) versions of GSM promise to

compete with CDMA (Code-Division Multiple Access) and emerging technologies well into the future.

CDMA

3G mobile wireless technology relies on the CDMA standard developed by Qualcomm. Its transmission method (called **spread spectrum**) assigns each call a unique code, breaks it into tiny pieces (attaching code to each chunk), and sends out bursts of data spread out over all available frequencies and time slots. All signals are carried over the same wide band of frequency, with a unique sequence code distinguishing one call from another. This method makes far more efficient use of the available spectrum and thus has a higher carrying capacity than other technologies.

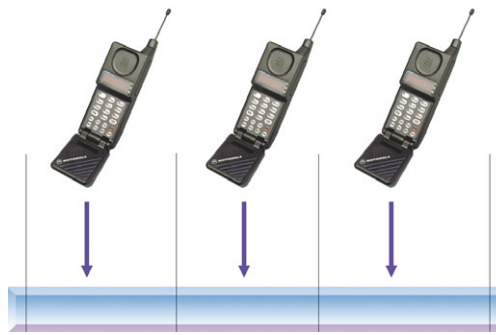
Carriers such as Alltel, Cellular One, and Verizon operate CDMA networks. Sprint's PCS (Personal Communication Systems) technology is a CDMA variant using smaller cells broadcasting in the 1,900MHz band. CDMA technology can transmit more data faster than competing standards (helping drive increased demand for data services) and can support more users (helping fuel the wireless price wars). In fact, CDMA supports four to five times the capacity of GSM systems, with improved security. The primary drawback to CDMA is the complexity of spread spectrum and the processing required to manage all the various calls, sequencing codes, and data.

Features

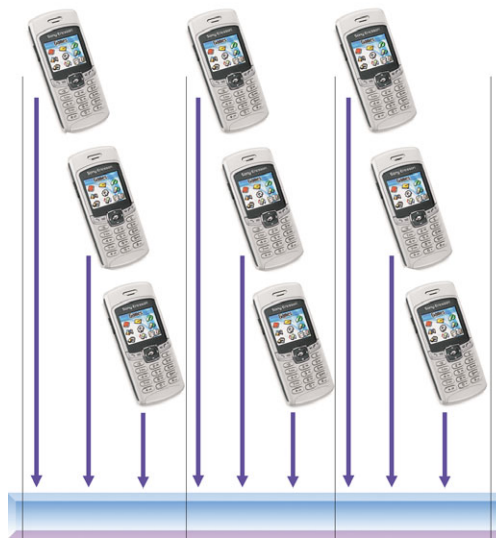
In addition to the basic transmission standards, there are plenty of supporting technologies in today's wireless world. These features enhance the wireless experience with text messaging, multimedia applications, and Internet connectivity.

SMS/MMS

SMS (Short Message Service) and the newer MMS (Multimedia Messaging



Analog FDMA technology allocates an entire slice of spectrum to a single user.



TDMA and GSM networks allocate time slots in distinct parts of the spectrum. Digital compression creates smaller transmissions, so each caller gets her designated slice one-third of the time.

Service) enable direct, brief, and near-instant communications between wireless devices. SMS is a text-only protocol, with a limit of 160 characters per message. An SMS Center stores and forwards messages with the help of carrier MSCs (Mobile Switching Centers) looking up the recipient's current location and availability. Because almost all GSM, CDMA, and TDMA networks support SMS technology, it's become the *de facto* universal messaging standard. With SMS, users can send brief, text-based messages quickly and easily, using a fraction of the power and bandwidth required for a phone call.

MMS is a successor to SMS, supporting audio, images, and video in addition to

plain text. Although MMS is compatible with existing GSM and GPRS systems, it is far more bandwidth-intensive than SMS and should help spur the adoption of higher-bandwidth 3G wireless technologies. MMS is widespread in Europe and Asia, and adoption in the United States is growing steadily. The most popular uses of MMS include instant picture sharing, sending and receiving audio files, and automatic information updates from service providers.

Picture Phone

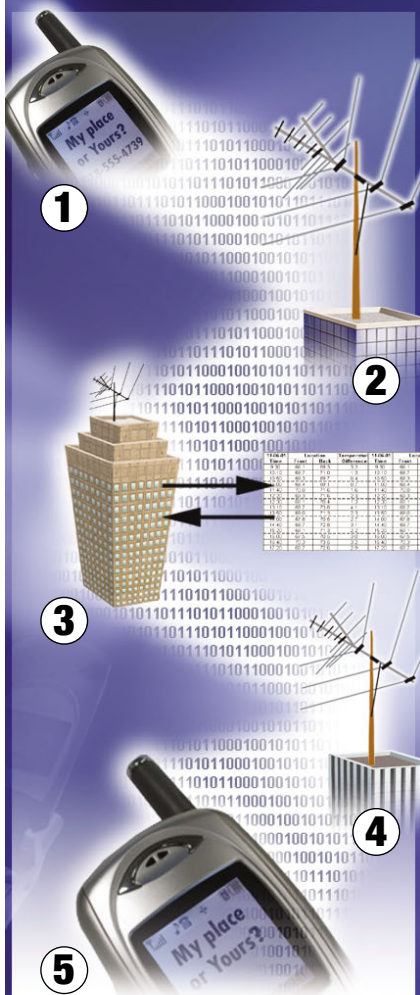
The explosion of camera phones in the last year may end up rivaling DVD for the fastest-adoption award. Most new phones have built-in cameras. Leaving aside issues of image quality and privacy, these devices display a fascinating blend of technologies. First, take a regular mobile phone. Add a small digital camera lens and sensor (usually under 1 megapixel), plus built-in or removable storage. Now, connect to your wireless service provider's network for sharing or online storage or to a PC for editing and printing. Some new models incorporate zoom options and even video-capture capabilities. The possibilities for hand-held photography are nearly endless (and sometimes nefarious;

see Sascha Segal's "Camera Phone Nation" column on page 14 for an opinion on the ubiquity of camera phones), but it's not yet a mature technology. Image resolution will continue to improve, as will interoperability. Current picture-sharing services aren't always compatible with other providers' networks, so you might have a limited audience for your snapshots.

Bluetooth

Bluetooth is one of those technologies we heard about for years before anyone saw it on the street. Although it once threatened to collapse under its own hype, Bluetooth is steadily gaining

How SMS (Short Message Service) Works



- 1** SMS-enabled handset. Enter a text message and select the recipient's phone number, email address, or pager number.
- 2** Short Message Center. An SMC stores and forwards the message to the wireless service provider's gateway.
- 3** Wireless service provider. Receives the message, checks sender's subscription information, looks up location and status of recipient, and forwards to recipient's local base station.
- 4** Base station. Broadcasts message to the recipient's mobile device.
- 5** SMS-enabled handset. Receives text message and replies, beginning the process again.

ground as a low-powered wireless networking standard for portable devices. A Bluetooth-enabled phone can connect to PCs, PDAs, accessories, and even automotive systems to create a PAN (personal-area network). With such a setup, you could use the phone as a modem for your notebook PC, surf the Web through a local wireless network or use a wireless hands-free earpiece to talk in the car. Bluetooth's ability to automatically recognize and connect to other devices creates security concerns, but the spread of connectivity provides powerful incentives for finding ways to make all of your toys play well together.

Wireless Web & Email

Because 2G and 3G wireless standards support digital transfers, and because phones are growing more and more powerful, the emergence of handheld Web and email applications was inevitable. With a basic browser and email client, wireless service can deliver Internet content and emails alongside calls from your grandmother. Most providers offer data add-ons to service plans, and most new phones include the basic software. As screen resolution and processing power continue to increase, anytime-anywhere Internet access will become a more prevalent option.

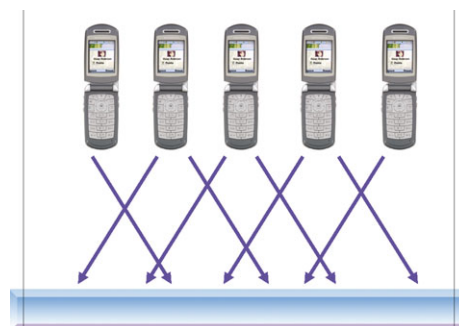
Smartphones

Mobile phones and PDAs converged into smartphones. The success of PalmOne's Treo 600 and competing devices from Motorola, Samsung, and Kyocera have turned this category into "the next big thing." Combining all the features of a handheld computer with all the features of a mobile phone certainly has appeal. For one thing, think of all the pocket and purse space to be saved. And wouldn't you like to have your entire address book available for calling or emailing just by touching a couple buttons? Traditionally, size and expense were the devices' drawbacks. Recent models have conquered the first (many are no larger than last year's phone-only models), and expanded

feature sets have helped improve the value proposition (although, without dramatically lower prices).

Handheld Entertainment

Since the advent of computers, people have been figuring out ways to have fun with them. It's no coincidence that super-computer vanity projects often center on chess prowess. So why are we surprised to discover our mobile phones clamoring for ringtones, video games, and wallpaper images? Though new transmission



CDMA uses spread-spectrum technology, encoding each message and breaking it into tiny pieces. Each transmission covers the entire spectrum, and the receiver recovers and decodes the signal based on its unique code.

technologies make the delivery of such applications more efficient and more convenient, running most of these programs is purely a local affair. And, again, as screen resolution and processing power continue to improve, expect to have more and more fun with your phone.

Few gadgets epitomize portability, communications, and convergence more than wireless phones. They combine 19th century radio technology with a 20th century infrastructure and 21st century innovation. And, although standards battles are far from over, manufacturers and consumers alike recognize the value of interoperability. Whichever wireless-service technology you choose, and whatever features you seek in a phone, count on a few things. Your model will be outdated in a year or two, and your options will continue to expand. **CE**

BY GREGORY ANDERSON

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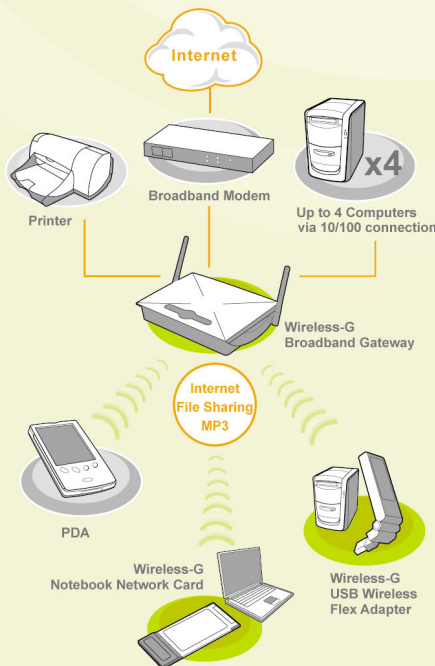
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GWU513

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GWP511

Wireless-G Notebook Network Card

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- Included Software Access Point allows you to turn your notebook into a wireless Access Point



Retire the Wire.

10 Great Calls

Phones That Stand Out From The Crowd

It's fairly easy to find a wireless phone that works. Truly extraordinary phones are rarer. The 10 phones below all stand out from the crowd—not only do they make great calls, but they offer unique features that their competitors are racing to catch up with. All should be available by the end of June.

Less Than \$150

It's hard to get less expensive than the **Nokia 3100/3105** (\$119.99), which wireless carriers sometimes simply give away. (The 3100 is a GSM [Global System for Mobile Communications] phone; the 3105 is CDMA [Code-Division Multiple Access].) It's a basic, no-nonsense, easy-to-use phone, with a twist: You can get an optional glow-in-the-dark faceplate. Although it doesn't have a camera, it can receive picture messages from camera phones, send text messages, and use IM (instant messaging). Relatively slim and light at 3.5 ounces, it holds quite a charge: six hours' worth of talk time and 17 days of standby time.

Several carriers have recently introduced rugged, walkie-talkie phones, but the **Motorola i305** (\$89.99) for Nextel still reigns supreme. Dunk it, boil it, throw it against the wall; this phone is certified to military standards for resistance against rain, sleet, snow, temperature, vibration, solar radiation, and salt fog. At 6.6 ounces, it's not light, but it'll keep working when all those other phones become miserable little puddles of plastic.



Style comes cheap with the **Kyocera Slider**, available from Verizon as the **SE47** for \$99.99 and from Virgin with special MTV content for \$149.99. The big feature here is the look: a sexy bubble phone that slides up to reveal a keypad. It also works as a modem (at about double landline phone speeds) and sports a nifty color screen. The battery will last you about 3.25 hours of talk time and four days of standby, and the Virgin version lets you download exclusive ringtones and games from MTV.

\$150 To \$299

For a simple, elegant camera-phone, you can't do better than the **Sony Ericsson T600** series, available from most GSM carriers. Sleek, small, and comfortable to hold, the series combines an easy-to-use camera (with, alas, no flash) with a big color screen, great sound quality, and Bluetooth networking. The **T616** (\$219.99) is the base model; the **T630** has an improved screen; and the **T637** features walkie-talkie capability. Battery life also varies, with five hours of talk time on the T616, nine on the T637, and a startling 14 on the T630. Prices vary.

Samsungi500



Sprint's Samsung
SCH-i500 (\$599.99) is
an oldie but goodie.



Sony Ericsson T637

For a simple,
elegant
camera phone, you
can't do better than
the Sony Ericsson
T600 series,
available from most
GSM carriers.

The **LG VX7000** is an upgrade to one of Verizon's most successful phones ever, the LG VX6000 cameraphone. The new model includes a 640 x 480 still camera with flash and a Night Shot mode for low-light conditions. You can also take and send 15-second video clips. All of the latest Verizon features, such as a Web browser, Get It Now! Downloads, and instant messages are onboard, as well. This 3.8-ounce flip phone provides 3.3 hours of talk time. The price of the VX7000 had not been set at press time.

Removable faceplates are so 2002. The Smart Skins on the **Curitel Identity** phone transform everything about the handset, including games, animated themes, ringtones, and even Web community links. Available only from Cellular One,

the Identity targets teens and young adults, with skins branded by music groups and fashion labels. Look for the GSM handset in June and expect to pay less than \$200; skins will cost around \$25. Expect your teen to start begging for one shortly afterward.

Samsung VM-A680

\$300 & More

Samsung's **SCH-A790**, which should be available

through Verizon when you read this, will be the first true worldphone for Verizon's wireless users. In the past, Verizon's CDMA technology has locked its subscribers out of most of the world, where GSM is the predominant technology. The formidable A790 changes all that, mixing CDMA and GSM to work almost anywhere. It also has a camera and a neat external color display, but that's not why you're buying this phone. The price wasn't set at press time, but we imagine it'll be high-end. Motorola is planning to release its competing worldphone later this summer.



The Samsung VM-A680 is the
**slimmest and
lightest**
Sprint videophone so far.



Verizon LG VX7000

The LG VX7000 is an upgrade to one of Verizon's most successful phones ever, the LG VX6000 cameraphone.

While most people play with camera phones, Sprint PCS users have moved on to videophones, which can take 15-second video clips, as well as stills. The **Samsung VM-A680** is the slimmest and lightest Sprint videophone so far; it also packs in a 640 x 480 still camera with flash and sports a little color display on the outside. The price wasn't available at press time, but all of Sprint's videophones cost more than \$300.

Sprint's **Samsung SCH-i500** (\$599.99) is an oldie but goodie; it's still the best keyboardless computer phone out there. It has the shape and feel of a slightly chunky flip phone, and it packs a Palm OS organizer into the top half without sacrificing a "regular" phone keypad and head-cradling shape. If you can possibly wait until later this summer, hold out for the **SGH-i505** with a GSM carrier instead; it adds a twisting display (letting the phone morph into a standard slab-style organizer) and a 640 x 480 digital camera.



PalmOne Treo 600

If you need to send a lot of email while you're on the road, the **PalmOne Treo 600** (\$549.99), available in GSM and CDMA versions, may be the ultimate device. You can hold it in one hand, it runs thousands of Palm OS applications, and it sports a full keyboard and 640 x 480-resolution camera. Thanks to its clever design, the tiny keyboard is much more usable than other keyboards its size, making the Treo the current reigning champ of email phones. 

BY SASCHA SEGAN

You can hold it in one hand, it runs thousands of Palm OS applications, and it sports a full keyboard and 640 x 480-resolution camera.

Providers & Plans

How Do Mobile Phone Plans Stack Up?

Nearly 600 million mobile phones will fly off shelves worldwide in 2004, according to Strategy Analytics, and each phone will be tied to a calling plan. Whether you want a phone for emergency use only or to replace your landline, there's a plan to accommodate nearly every need. Choosing is tricky, especially if you're in an area covered by multiple providers. None of the companies we contacted would disclose their upcoming plans or special offers, so this information is current as of April and is subject to change; however, it provides an overview of each of the top providers' strengths and weaknesses. Note that Cingular acquired AT&T Wireless in February, and offerings that are planned after the two companies fully merge were not available.

Alltel www.alltel.com

Alltel has relatively few handsets, with 11 models and only one phone/PDA unit, the Palm OS Kyocera 7135 (\$499.95 with a two-year contract). One highlight is the Kyocera 3250, which doubles as a long-range walkie-talkie to take advantage of Alltel's Touch2Talk service. When operating within Alltel's Touch2Talk network, you can instantly see if other friends or family members are available for walkie-talkie communications, and then you can simply push a button to instantly talk to any of those people. Up to 10 people can participate in a session, and the service costs \$5 to \$20 per month depending on how many minutes you expect to use.



For voice calls, the company's Total Freedom plan is its most flexible, as it doesn't charge for long distance or roaming throughout the country. The opposite is the less expensive Local Freedom plan, which charges for long distance and roaming, but the FreeToRoam option adds 100 nationwide minutes for an additional \$10 per month for those who leave town occasionally.

Alltel's National Freedom Plan offers perhaps the best compromise for families. There are no long-distance or roaming charges as long as you call within the Alltel National Freedom network, which covers most metropolitan areas.

All accounts feature voice mail, Caller ID, three-way calling, call forwarding, call waiting, and other basic features, while others, such as ringtones, games, text messaging, email, and pictures are available for additional fees. Customers can add up to four additional lines to any account for \$20 per line, share minutes between the phones, and benefit

from unlimited free calls between those phones or from those phones to a home phone number. Internet access is available through Alltel's MobileWeb service, which costs \$5.95 per month plus airtime.

AT&T Wireless www.attwireless.com

AT&T Wireless has the best selection of phones by far, with 29 models. These include the Handspring Treo 600 Palm OS PDA and phone combo and several Blackberry products.

The company's services are divided into Local Plans for people who rarely stray from their local service area, National Plans for those who tend to travel between large cities, and AT&T Wireless Digital One Rate Plans for those who frequently travel throughout the country. Roaming charges apply to Local Plan customers who stray out of their local service area or off the AT&T Wireless network; roaming charges only apply to National Plan members who leave the AT&T Wireless network, and they don't affect AT&T Wireless Digital One Rate customers at all. Local Plan and National Plan customers willing to lock into a two-year contract can sign up for a SureRate account, which charges only 8 or 9 cents per minute, respectively, should users exceed their monthly allotment of minutes.

AT&T Wireless customers with plans that cost \$59.99 per month or more (excluding those using a Shared Local Plan) receive Early Evenings, which lets night and weekend minutes kick in at 7 p.m. instead of at the standard 9 p.m. Internet and other online access is provided by

AT&T's optional mMode service, with prices starting at \$2.99 for pay-as-you-go access. AT&T also offers GoPhone, which starts at \$19.99 per month and doesn't require an annual contract.

Cingular

www.cingular.com

Since acquiring AT&T Wireless, Cingular has become the No. 1 cellular service provider in the United States, and the company offers a variety of hardware and service plans. Phone availability varies depending on the area you live in, but in major metropolitan areas, users have access to nearly two dozen handsets, including several Blackberry devices.

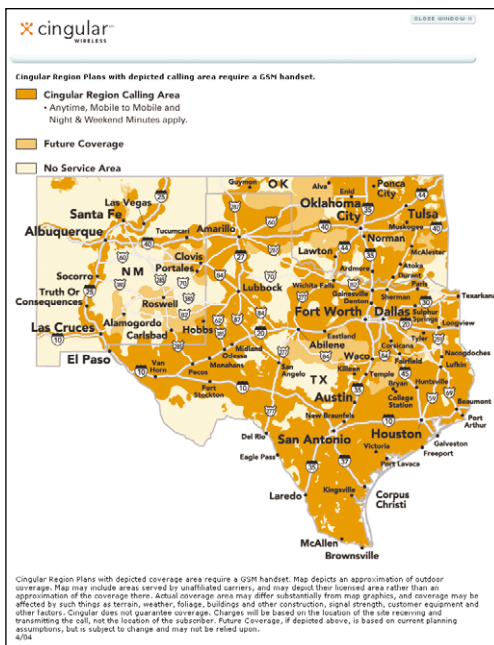
Several plans are aimed at Blackberry users, and several local and national plans are available for voice calls and Internet access. Nation GSM Plans feature free long distance and roaming, and Regional Plans have the same service as long as users don't wander out of their service areas. Plans that cost \$39.99 or more per month are eligible for FamilyTalk, which lets four phones share minutes for \$19.99 per month per phone. All plans include call waiting, caller ID, three-way calling, voice mail, and other basic services, with additional services, such as text messaging and roadside assistance, available for a monthly fee or at a cost-per-download. Wireless Internet access is also available for \$3.99 to \$6.99 per month, plus data download fees, for phones equipped to take advantage of the service.

Cingular touts its Rollover service, which is available under all plans. This service carries over unused Anytime Minutes into the next billing cycle, letting users keep them for up to 12 months, at which time the minutes expire.

Nextel

www.nextel.com

Nextel currently has only nine available handsets, including the BlackBerry 7510. Several of the company's phones have GPS (Global Positioning System)



Read coverage maps carefully to avoid expensive roaming charges. If you'll often use the phone outside of major metropolitan areas, consider buying a plan that doesn't charge extra for roaming.

equipment installed, and all are Internet-ready.

Another feature common to all Nextel phones is a PTT (Push To Talk) button, which you can use with the optional Direct Connect service. This feature lets Nextel users operate their equipment like a walkie-talkie, instantly connecting to any other Nextel user in the local area or even coast-to-coast if you've selected Nationwide Direct Connect. Group Connect extends the service's capabilities to let up to 25 people yak at the same time.

Users buy minutes for this plan separately, and they don't cut into the voice call minutes included in any of the several available service packages. The National Value Plans allow free roaming and long distance nationwide, and a few National Free Incoming Plans are available that provide unlimited Direct Connect minutes and don't charge for incoming calls. The National Team Share and National Shared Minutes Plans let users add several phones to the same account to share minutes among them. Finally, the National Unlimited NDC Plus

Plan is one of the cheapest unlimited-everything plans we've come across. For \$199.99 per month users get unlimited minutes to use toward voice calls and Direct Connect, with only call forwarding and text messaging tacking on additional fees. All plans include call waiting, call holding, and three-way calling.

Sprint PCS

www.sprintpcs.com

Sprint PCS seems to focus on high-end hardware, with five of its 16 handsets incorporating Palm OS or Pocket PC PDAs. These include the popular Handspring Treo 600 Palm OS device and a number of picture phones.

Sprint's two main PCS Free & Clear Plans include Nationwide and Area-Wide. Both offer nationwide long-distance calling, but Night and Weekend minutes on the Area-Wide Plan are restricted to the user's extended calling area, while Nationwide subscribers can use their unlimited Night and Weekend minutes anywhere.

The Add-A-Phone service lets users with plans that include at least 500 Anytime minutes share the minutes with up to four other phones on the same account for \$20 per month per phone. Free & Clear America lets users roam free as long as they use less than half of their monthly call time doing so. It's possible to upgrade Night and Weekend minutes on any plan, so the minutes are available at 7 p.m. instead of 9 p.m. Voice Command lets users call a contact by saying his name, or dial by saying a number, so there's no fumbling for buttons. Ready Link is another available option that provides instant walkie-talkie-like communications between any two phones on the Sprint PCS network that are compatible with this feature, as long as they are not additional phones operating under the Add-A-Phone service. For standard calls between two PCS phones on the network, unlimited PCS-to-PCS calling is available for an extra \$5 per month.

All plans include voice mail, Caller ID, Call Waiting, numeric paging, three-way

calling, call forwarding, and more. Sprint provides Internet and other online access via its PCS Vision service, which charges by the amount of data users download, not by the amount of time they spend connected to the service.

T-Mobile

www.t-mobile.com

T-Mobile features 15 handsets, and five of those are PDA/phone combos with the highlight being the company's proprietary Sidekick. The color display on this Internet-enabled device slides to reveal a QWERTY keyboard that is useful for sending text messages and email.

Standard phone plans are divided into Whenever, Weeknight (9 p.m. to 6:59 a.m. Monday through Friday), and Weekend (12 a.m. Saturday to 11:59 p.m. Sunday) minutes and all include voice mail, paging, call waiting, call hold, and other features. National Rate Plan subscribers pay no long-distance or roaming charges anywhere on the T-Mobile network, while Regional Rate Plan subscribers are charged for long distance and roaming only if they leave their local service region.

Most plans offer unlimited Weeknight and Weekend minutes, and Weeknight minutes include free long distance and roaming. A flat rate of \$19.99 per month T-Mobile Internet Unlimited add-on gives customers unlimited access and data transfers and up to 300 free text messages per month (with a 5-cent charge for each additional message). You can tack a number of additional optional services onto the standard plans, including text messaging, HotSpot wireless Internet access (for Wi-Fi devices), picture messaging (for camera phones), and unlimited mobile-to-mobile minutes, among others. Mobile-to-mobile minutes are important to T-Mobile's FamilyTime plans, which come standard with two lines and let users add up to three additional lines to the same account for \$10 per month per line. Unlimited calls can be made between these phones using the unlimited mobile-to-mobile minutes included with FamilyPlan accounts.

T-Mobile also has a plan tailored to RIM BlackBerry users; it has no Whenever minutes but provides unlimited email and Web access for a flat rate of \$39.99 per month and a similar \$29.99 per month for their Sidekick handset. BlackBerry users can add Whenever minutes for an additional monthly fee.

Verizon Wireless

www.verizonwireless.com

Verizon subscribers have access to a respectable range of equipment, with 18 phones (with a two-year contract) priced from \$9.99 for a bare-bones model to \$599.99 for a Samsung SPH-i700 that combines a Pocket PC, digital camera, and phone into a single device.

With the New Every Two program, users are eligible with a two-year subscription to certain digital plans that cost at least \$34.99 per month. At the end of the two years, eligible users get a new

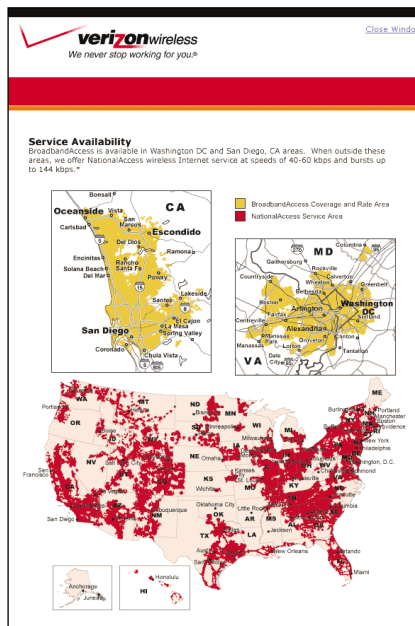
The National SingleRate plan charges a flat fee for airtime anywhere in the country, with no long-distance or roaming charges. Local DigitalChoice plans charge extra for long distance and roaming. Customers can save money by opting for plans that include IN-Network Calling, which lets them talk to other Verizon Wireless customers free as long as both phones are in the IN-Network Coverage Area (Local DigitalChoice customers can only call people in their local IN-Network Coverage Area). Family SharePlans let users add lines to the same account for \$20 per month that all share the same pool of minutes and can make unlimited calls to one another within the national IN-Network Coverage Area.

Users with Internet-capable phones can sign up for Verizon's NationalAccess, which features access speeds ranging from 40Kbps (kilobits per second) to 144Kbps. Customers in the San Diego and Washington, D.C. areas can spend \$79.99 per month to upgrade to the BroadbandAccess service, which operates around 300Kbps to 500Kbps, with burst speeds of up to 2Mbps (megabits per second, equivalent to cable modem or DSL [Digital Subscriber Line] speeds).

Shop Around

When shopping for a wireless plan, check the companies' Web sites for special offers; many providers have excellent deals that are available only to Internet shoppers. Also, check coverage maps. Although most companies have excellent overall coverage for voice calls, data-related services, such as Internet access, may not be available in all areas.

Finally, beware the pitfalls of the prepaid access plans many companies offer these days. Service overall is cheaper for those who make very few mobile calls because there are no monthly fees, but generally there are more upfront hardware costs that offset the savings. As with all services, it is more important to focus on the big picture than to fixate on one particular detail such as monthly fees. 



Verizon has broadband Internet access available for mobile phone users, but be sure you live in one of the few coverage areas that offers the high-speed connection.

phone valued at \$100 or less, or apply the \$100 toward a more expensive model, but only if they sign up for another two-year contract.

BY TRACY BAKER

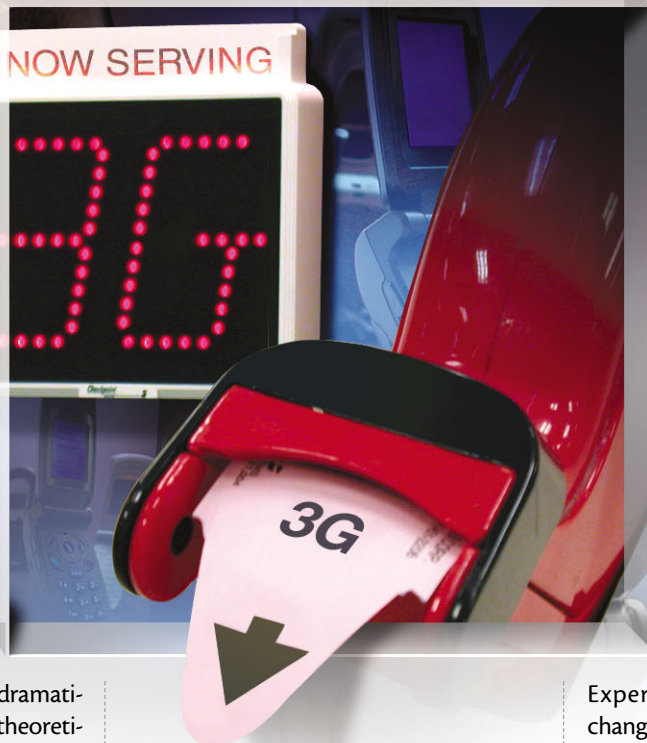
Up Next: 3G

Multimedia Meets Your Cell Phone

Talking on your cell phone's nice, but over the next couple years you'll be able to use it for much more than conversation. Actually you already can, as anyone into text messaging or photo sending can attest. And that says nothing of playing games or viewing those little all-text Web pages. Get ready for more data-intensive cellular activities, however, including transmitting good-quality sound and video. Cellular multimedia is just around the corner.

The reason is 3G. An abbreviation for third generation, the initials refer to the next wave of cell phone technology, in which transfer rates increase dramatically. In fact, 3G cell devices are theoretically capable of downloading data at nearly 5Mbps (megabits per second), although, as with pretty much all things network-related, actual speeds are lower. Today's estimates range closer to 2Mbps as a theoretical limit, with transfers well below 0.5Mbps in practical use.

Still, even a speed of 384Kbps (kilobits per second), which you can find advertised today on cell provider Web sites in Europe and Asia, represents a serious increase in the cell phone data transfer speeds. 2G (second-generation) phones have typically clocked in at roughly 14Kbps to 40Kbps (remember your 14.4Kbps modem?), with 2G.5 (interim second-generation) systems running in the 56Kbps to 100Kbps range. A 3G system with real-world speeds of 384Kbps to 500Kbps obviously changes what your cell phone can do, just as moving from dial-up to broadband access changes the way you use the Internet.



What can we expect? Well, to judge from the Web sites of 3G providers in Europe, many things. When you finally have the opportunity to switch to 3G, you blur the distinction between being on a cell phone and being on your Internet-connected notebook PC. Chalk it up to **convergence**, that overused but increasingly applicable term referring to the coming together of a range of communications technologies.

3G Phones & Services

Although 3G-capable phones come in a variety of styles, a fully equipped unit offers numerous multimedia features. As an example, let's look at NEC's e616 handset, one of several units designed to take advantage of 3G technology.

The e616 is capable of download speeds of 384Kbps and upload speeds of

64Kbps. It supports SMS (Short Message Service) and MMS (Multimedia Messaging Service) for text and multimedia messaging and is equipped with Bluetooth networking technology for wireless connections. The phone contains a small still/video camera, complete with 2X digital zoom and low-light capabilities, as well as GPS (Global Positioning System) capabilities for use in finding services based on location. You can play Java games on it (the phone has Java installed), plug in expansion memory (Sony Memory Stick), and stream audio and video feeds to it. The phone displays JPEG (Joint Photographic

Experts Group), GIF (Graphics Interchange Format), BMP (bit mapped), and PNG (Portable Network Graphics) graphics files (among several others) and plays MP3, MIDI (Musical Instrument Digital Interface), WMA (Windows Media Audio), WAV, and AAC (Advanced Audio Coding) sound files and WMV (Windows Media Video), ASF (Advanced Streaming Format), and MPEG-4 (Moving Picture Experts Group-4) video files. The display shows 240 x 176 pixels with 64,000 colors.

As with current cell phones, 3G services will vary depending with providers. You can expect a range of options, however, including some of the following.

Video calling. Here, you'll be able to dial up anybody with the same service and see him as you talk to him. You'll need a phone equipped with a video camera, of course, as will the person you're calling, and we can only hope that the phones will feature an easy way to turn off the camera for those times when you'd rather not be seen.

Enhanced messaging. Everything you can now do with text messaging, you'll be able to do with text, sound, graphics, and video with 3G phones. You can record a short video message (10 seconds or so) and send it to your friends or associates, or you can add pictures and other attachments to your standard messaging.

Enhanced Internet activities. Web browsing is possible with 2G cell phones, but the higher-speed Internet access capabilities of 3G phones, as well as the color displays, make the Web look more as you're used to seeing it. Email takes on additional possibilities, primarily because of the ability to send attachments, but typing is, of course, even more difficult than with PDAs. As long as your organization's IT department puts the necessary components in place, you'll be able to connect directly

to the company network, viewing or retrieving networked data as you need it.

Maps and locations. The problem with being mobile is that sometimes you get lost. Or, at the very least, you don't know where to find the nearest restaurant, gas station, or bank machine. Using GPS technology, as well as downloadable maps, your 3G phone will be able to tell you where you are, where to find the resource you need, and what the weather will be like once you get there.

Games. You can play games on your cell phone already, of course. 3G phones will feature better graphics and sound and, in all likelihood, a wider range of online games.

Sports and entertainment. Download music and music videos, watch entertainment highlight shows, and much more. Keep up with your favorite teams,

and watch video highlights of the top plays. Think of entertainment and sports on the Web, and you get the idea.

In Search Of The Killer App

The technology for 3G cell networks has been around for a while, but 3G offerings are sparse, not only in North America, which lags in cell adoption (most people still have landlines), but also in Europe and Asia. Why? Networks remain unsure of the demand for high-speed services. Conversation remains the primary function of cell phones, and current cell technology works quite well here. When you consider that interactive TV, programming-on-demand, and other upgrades to the TV market have been slow to catch on, you can see why cell providers may be reluctant to jump into

Cell Phone Generations & Terminology

Whether or not you're aware of it, you've already gone through two generations of cell phone technology. The first, originating in 1981, used analog (FDMA) rather than digital modulation, operating in the 900MHz-frequency range. In the early 1990s, cell providers adopted the TDMA standard in North America and GSM in Europe and, improving audio quality through digital modulation, these two standards comprised 2G (second generation). Additional technologies later enhanced TDMA and GSM, including GPRS (General Packet Radio Service), HSCSD (High Speed Circuit Switched Data), and EDGE (Enhanced Data for GSM Evolution), giving rise to what's been termed 2G5 (basically, cellular version 2.5). More recently, cell providers in Europe and Asia have

adopted UMTS, while those in North America have brought CDMA2000 into the picture, and these are the core technologies underlying 3G, the third generation.

FDMA (Frequency Division Multiple Access). Divides the frequency spectrum into several channels, with each phone call taking over the entire channel for the duration of the connection (that is, until the users terminate the call). Each channel occupies 30KHz.

TDMA (Time Division Multiple Access). Streamlined version of FDMA that uses voice compression to reduce channel size to 10KHz, effectively tripling the number of channels available. Combines channels with time slots to perform the necessary voice sampling and transmission.

GSM (Global System for Mobile Communications).

Improves on TDMA by using smaller timeslots but transmitting more frequently, reducing the number of timeslots even further at times of silence in the conversation. Uses frequency-hopping to move data from channel to channel for efficient channel use. A control channel performs the coordination among channels and conversations. Another technology, GPRS, enhances GSM by adding packet-switching capabilities, making it more Internet-like and therefore less dependent on channel management.

CDMA (Code Division Multiple Access). Spreads calls over the entire 12.5MHz frequency spectrum, dividing groups of messages into 10 smaller pass-bands instead of (as with FDMA and TDMA) assigning a specific frequency to each call. The

originating phone encodes the message in a way that distinguishes it from all other messages on the spectrum, and the receiving phone extracts the message by recognizing the code. All other messages on the spectrum are available, but their coding prevents them from being picked up by any except the intended phones. CDMA2000 is the 3G version of the CDMA, offering 2MBps (megabytes per second) download speeds.

UMTS (Universal Mobile Telecommunications System). Packet-switching technology (such as CDMA) that provides 2MBps download capabilities and multimedia capabilities. Also, like CDMA, it works on a spread spectrum basis and is seamlessly available geographically. Also known as W-CDMA, or Wideband Code Division Multiple Access. ■

The 3 Gs Of Cellular Telephony

Type	1G	2G	2G5 (2.5G)	3G
	Analog	Digital	Enhanced Digital	High-Speed Digital
Services	Voice services only	Voice, Web browsing, text messaging, email	Enhanced email, download services	Audio and video streaming, location services, enhanced gaming, multimedia messaging
Technical Highlights	Each call gets an exclusive 30KHz channel	Three calls per 30KHz channel through use of timeslots; GSM introduces frequency hopping for still greater efficiency; CDMA introduces 1.25MHz pass-bands with calls spread throughout	Packet switching for greater messaging efficiency, higher data transfer speeds	Faster data transfer speeds, larger packets, extended synchronization features
Primary Protocols	FDMA, AMPS	TDMA, GSM, CDMA	GPRS, EDGE, HSCSD	CDMA2000, UMTS, WCDMA

costly new services because the technology allows it. If it ain't broke...

For the consumer market, any killer app will likely revolve around 3G's video capabilities. But whether this means video calling, music video, full-motion real-time camera transmissions, or a combination remains to be seen. The charm may be that 3G phones will replace MP3 players and picture phones while acting as a digital radio tuner and, in a remotely possible scenario, a video-on-demand device for cars. Then again, MMS could prove a significant draw. The problem is that nobody really knows.

For businesses, 3G's data transfer speeds let cell phones replace some of a notebook PC's functions. Sending graphics files, or even large PDFs (Portable Document Format), becomes feasible at



View Web sites and Microsoft Office documents with the Motorola A1000, which includes a 1.2MP digicam.

speeds nearing 400Kbps to 500Kbps, as do activities such as uploading files, showing PowerPoint slides online, and logging into the company's VPN (virtual private network) and using the available programs. The benefit of 3G is that these activities don't require a Wi-Fi wireless hotspot or a cellular-based modem for a notebook. With a 3G phone, you can connect from anywhere the service exists.

When the Web took off, debates raged over whether it would become a killer app for

business or personal use. Ultimately, both. As 3G finds its legs, watch for it to do the same thing.

So When Does This Happen?

One of the problems with 3G lies in its definition. The industry continues to

argue about what constitutes a 3G service, in part because the potential of a 3G service and its current reality remain quite different. Indeed, some 100Kbps services are advertised as 3G when they don't fulfill the consumer expectations of a much more capable multimedia system. According to Charles Golvin, a senior analyst with Forrester Research, services of 100Kbps are more clearly within the 2G5 camp, including AT&T's EDGE (Enhanced Data for GSM Evolution) service (EDGE is based on GPRS [General Packet Radio Service]). He also says, however, that consumers won't care about the underlying technology, only about what the service can do for them. Which, of course, is as it should be.

Golvin also notes that a principle difficulty with moving to a technology, such as the WCDMA (Wideband Code Division Multiple Access) available in Europe and Japan, lies in the complexity of the transition from current technologies. U.S. carriers work with 1.25MHz channel sizes, while WCDMA provides 5MHz sizes. Add in analog coverage, and resolving how channels can function together is an obvious stumbling block.

Still, 2004 will see the expanded rollout of the first widespread 3G service in the United States with Verizon's CDMA2000 1xEVDO service, called "Express Network." Data transmission speeds are in the 400Mbps range for downloads, with higher speeds predicted. Video telephony is unlikely for this network, according to Golvin, because upload speeds remain slow (a problem that WCDMA partially solves). Golvin expects Verizon's primary customers to come from the enterprise side, with people accessing the network using notebook and PC cards.

To gauge 3G's future, watch this year's offering from Verizon, AT&T, and Cingular, and keep your eye on the European and Japanese markets. There, according to the Yankee Group, consumers rather than business users will show the most important adoption trends, as even today business customers generate less than 10% of mobile industry revenues. **CE**

BY NEIL RANDALL



Lighten Up.

It wasn't so long ago that if you wanted to bring your data with you, your hardware had to come too. Well, that's all in the past now thanks to the new SanDisk Cruzer™ Mini. At under half an ounce, the Cruzer Mini goes anywhere, and with up to 256MB of flash memory, it takes a lot with it. Hi-speed USB 2.0 compliant, SanDisk's Cruzer Mini lets you transfer data faster than ever before. And at less than 8mm thick, all it needs is a single USB slot. Just drag, drop, and go. It's all about convenience – no extra hardware, no worries.

So whether you're installing utilities or updating print drivers for the umpteenth time, you can take your files with you wherever you go – and you won't even need your dolly.



For more information on SanDisk Cruzer Mini, visit www.sandisk.com/smart



SanDisk

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Suitable For Framing

Shooting Better Portraits Takes More Than Saying "Cheese"

People will shoot pictures of just about anything. This is particularly apparent if you've ever seen a group of tourists turned loose for the first time in a foreign land. It shouldn't come as any surprise, though, that the number one subject for photographers everywhere is other human beings. For many casual shutterbugs, family and friends are the only things they shoot, in portraits of varying degrees of formality.

More than any other type of photography, portraiture is a collaborative medium. You and your subject can have an equal impact on the final results. Unlike landscapes and still-life objects, other people can continually interact with you. They can follow directions and offer their own suggestions. They're mobile. And their faces can register the emotions we all feel and recognize.

An especially effective collection of images of Marilyn Monroe was once described as photos shot by a man who had mastered the art of looking at women, of a woman who had mastered the art of being looked at. While you may not aspire to that level of mastery, honing your awareness of what you're doing and deepening your sensitivity to your subjects should leave you wide open to their strengths and vulnerabilities alike.

Tools Of The Trade

Professional photographers shoot most portraits with, naturally, pro-level gear: multiple studio lights, umbrellas and other reflectors, backdrops, and medium- and large-format cameras that

create bigger negatives than 35mm cameras do. Or, if it's a digital camera, it's likely to have an extremely high resolution, such as the 14-megapixel Kodak Pro DCS-14n.

All of this is beyond the budgets of typical home enthusiasts. But with enough attention to detail, you should be able to get excellent results from more modest equipment. Here's a checklist of things you might want to make a regular part of your sessions:

Camera. As always, an SLR (single-lens reflex) model will provide infinitely more creative options than a basic compact (or point-and-shoot) camera. You can swap lenses, wield independent control over shutter speed and aperture, and often benefit from more accurate built-in metering. Also, because portraiture frequently means close-up work, an SLR's TTL (through-the-lens) viewfinder will prevent **parallax error**, those head-lobbing misframings that can result when a separate viewfinder sits higher than the lens.

This isn't to say you can't snap good portraits with a compact camera. You can. Some better digital compacts offer most of an SLR's features. But if you want the full bag of tricks, especially lens-swapping capability, a true SLR is the way to go.

Lens. Because the camera and subject are in such close proximity, it often surprises novice photographers to learn that pros often use short telephoto lenses for portraits. Whether you're



using a 35mm or digital SLR, or even a high-end compact with a retractable telephoto lens, a focal length of 100mm to 120mm is ideal for basic portraits, although anywhere in the range from 80mm to 150mm can work.

Why is this? Telephoto lenses compress apparent distance. This is obvious when they're used outdoors; objects sitting at various distances behind your subject will end up appearing much closer together than they actually were. In portraits, the same thing happens, only to a far more subtle degree, with the lens gently compressing facial features for a flattering effect.

For this reason, wide-angle lenses are a bad choice for typical portraits. They can have the opposite effect, distorting such features as noses and ears, making them seem more prominent. But don't dismiss wide-angle lenses altogether; they have their uses in certain situations, as we'll see.

And just because a telephoto lens is good, it doesn't mean an ultra-telephoto lens will be even better. Leave the 300mm and stronger lenses for wildlife and sports long shots, unless you're after an extreme close-up of an eyeball. However, if you're some distance away, a long telephoto lens will let you take candid portraits when you're out to capture your subject behaving entirely naturally.

Tripod. This is essential to keeping the camera steady when using slow shutter speeds (below 1/60 second) in low-light situations. Moreover, telephoto lenses are less forgiving of camera shake than standard lenses.

Flash. Whether it's used at low power to fill in shadows or is serving as the primary source of illumination, a good flash unit is just as important as a tripod. Flash use, and accessories such as diffusers, which soften the light, is a subject of its own (and, in fact, just last month it was. If you need to brush up on flash fundamentals, see our May 2004 issue, page 80).

A stool or chair. Seriously. Vases of flowers don't arbitrarily wander out of frame. Human beings will. If you're going to shoot for any length of time, or stop to fuss with the camera, you'll want your subject to remain comfortable. A

restless subject can quickly graduate to an uncooperative subject.

Strike A Pose

How to visually approach your model calls for all the creativity you can bring to the task. Shooting someone stiffly posed against a stark background may have a 19th-century austerity, but the photo probably won't say much about who the person really is, unless he has an austere 19th-century demeanor, in which case record the truth and call it a day.

But this kind of minimalist composition can still have an impact if your subject has an expressive or animated face and isn't self-conscious in front of the lens. Vivid contrasts in color and texture, such as red silk against a blue wall, or jet-black hair over pale skin, can generate a dramatic effect.

Ideally, you'll want to end up with a shot that conveys something about the individual, whether a facet of her personality comes shining through, or she's in a setting that reflects her life or frame of mind. How you achieve this is as likely to come from being quick on the shutter when you see a prime opportunity as it is from putting a great deal of planning into your composition.

Whatever tableau you come up with, whenever possible, make focusing your lens on the person's eyes your main priority, whether you do this manually or use the eyes as the target spot for the camera's autofocus. Whether or not they occupy the center of the frame is a judgment call; the main objective is to let them draw the viewer into the shot. For an object lesson on how effective that can be, you need only think of the famous *National Geographic* cover



One person, three very different views: On the left is your standard assembly line portrait, shot by a traveling photographer. It's a perfectly respectable likeness, the kind that grandmothers adore, but says virtually nothing about the subject other than, "I got roped into sitting for Olan Mills." On the right, a smoky, blighted urban background, an incongruent foreground prop (a spear), and grainy black-and-white combine for an eerie portrait of desolation. Finally, face paint, cornstarched hair, and ivy are the key ingredients in a portrait inspired by ancient Green Man carvings; a narrow depth of field keeps the focus confined to the center third of the shot.



When photographing children, it's best to get down into their world and let them show off and be themselves. In this colorful shot, we're also seeing an exciting new artist and her latest works.

photo of the refugee girl taken during the Soviet invasion of Afghanistan in the 1980s. It's one of the most recognized images from the last quarter-century, and what immediately pulls the viewer in are her huge, haunted eyes.

Domesticity. One obvious place to begin is in your subject's home, surrounded by accumulated prized possessions, or going through normal daily activities. In her book "Women Before 10 a.m.," photographer Véronique Vial captures nearly all of her subjects at home in a wonderfully intimate depiction of morning routines: waking up, having that first coffee, grooming, playing with children or pets, and more.

Resist any temptations (yours or theirs) to pick up around the house before the shutter starts snapping. Clutter can be quite revealing. And keep an eye out for interesting nooks and crannies that might cocoon your subject.

At work and play. It's been observed that Americans, more strongly than anyone else in the world, define themselves by what they do. If you have access to your subject in the workplace, you may be able to capture a big piece of his self-image, bearing in mind that the world really doesn't need a jillion

portraits shot at people's computer monitors.

If your model has an all-consuming hobby or other passion, making this the central theme can be equally revelatory, and maybe even more so than one's vocation, because it's likely to come from a place deeper than the need for paychecks. A musician with his instrument, an artist before her work, an avid gardener inside a riot of greenery—each of these scenes doesn't portray merely a person, but a life's pursuit.

Sports and fitness are tremendously important for many people, and photographing them in this context can reveal a more dynamic side of their personalities. Additionally, it can let you concentrate more heavily

on bodily lines (a long, angular runner stretching muscles before hitting the road) and contrasts in form (the smooth skin of a weightlifter juxtaposed against a cold, hard iron plate).

When you would like to show not only the person, but encompass a substantial portion of the environment, too, (those home and garden and work shots we've mentioned), that's when it may actually be a good idea to break out the wide-angle lens. Just use it with care: The shorter the focal length, especially around 24mm or less, the wider the angle of view, and, thus, the greater the possibility for unflattering distortions. To minimize this risk, keep

your subject in the center of the shot and maintain a few feet of distance, so she doesn't appear to be looming toward the lens.

Indoors and outdoors. No matter where you're shooting, keep an eye peeled for anything you can exploit to complement your subject and add visual

interest. Windows and doorways have a long tradition of being used for adding a frame-within-the-frame dimension. It's also fairly easy to improvise with natural features such as tree trunks and limbs, greenery, and rock formations.

You can use stairways to great visual effect, especially when shot with a wide-angle lens, which will stretch the depth perspective in interesting ways. A long stairway might even appear to narrow toward a vanishing point. Just don't shoot upward at a subject descending the stairs, no matter what lens you're using; those oncoming nostrils won't look good.

When you're looking for less direct interaction between subject and surroundings, practically anything in the environment has the potential to be used as a backdrop: brick and wooden walls, murals, signs, textures such as bark or mottled paint, wheat standing in a field, distant landmarks. Use your eye, and then use your imagination.

Just be aware that there can be a fine line between adding visual interest and creating distraction. The background



Not all shots have to be taken with the subject's knowledge. In this candid portrait, catching her unaware leaves the viewer wondering what she was thinking.

should enhance the overall image, not compete with your subject for attention.

If that's starting to happen, the easiest fix is to zoom in tighter on your subject. But if you have control over your camera's aperture, it may be more effective to blur the background. A wide aperture (the lower numerical settings on the

f-stop) will impose a narrow depth of field (the region of the photo that's in focus). The wider the aperture, and the more distance there is between your model and the background, the less in focus the background will be. Reducing a busy background to indistinct shapes and colors will help maintain visual variety while keeping your subject the clear focal point. Obviously, this is easier to pull off outdoors, where you can move around as much as needed.

Group shots. For groups, most of the above principles are still valid, but the more people there are, the greater the challenge to arrange them. Simply putting everyone in a straight row looks like a police lineup. At the very least, have some sit and others stand so they're at different heights.

Even better, try staggering their positions, with some closer to the camera than others, so one or two individuals become the main focal point. Again, a wide-angle lens can be used to interesting effect here, by giving the illusion of greater separation between those in the foreground and those in the background.

And take lots of shots. The more people there are, the greater the likelihood that some will have their eyes closed, or their mouths open, or will just be looking less than their best.

Living In The Light

Light quality alone may not make a great portrait, but it sure can prevent one. With any type of photography you need to be aware of the light's direction and its intensity, but nowhere is this more important than in portraiture because bad lighting never reduced a bowl of fruit to tears over how terrible it looked.

In the broadest terms, light is either **direct** (emanating from one direction) or **diffuse** (scattered and reflecting from various surfaces). Both have their applications in portraits, but under most circumstances you'll want to avoid harsh direct light that produces stark shadows and a severe appearance.

Outdoors, this means you'll usually get better results on overcast days,

when the sunlight is broken up by clouds and illuminating the subject's face evenly. If you have to shoot in the middle of a bright, cloudless day, at least get out of the direct sun and into some mild shadows. Or try the gentler, oblique rays of early morning or late in the day. When the sun is low, it's easy to position your subject to take advantage of side lighting, which is good for revealing facial contours, clothing texture and folds, and so on.



In this character study, the viewer is invited to share in the folk musician's concentration on his instrument by seeing him from almost the same slightly elevated perspective as he has on his fiddle.

Indoors, you can still use natural light, as long as the room has ample sun exposure, although when shooting near a window it can be easy to lose all detail to backlighting if you're shooting directly into the light. Then again, a monochromatic silhouette in profile can be a legitimate portrait, too.

Light direction is crucial to how much of your subject's features you want to reveal. If you intend to clearly show the entire face, you'll need frontal lighting (not too harsh), or ambient light coming from multiple directions. A single light from one side will throw the opposite side into shadow—a moody, noirish effect that

can evoke a sense of mystery. Three-quarter lighting is a compromise between these two extremes, in which the main light source is situated at a 45-degree angle relative to the lens, to deliver just enough shadow to give good depth.

No matter how strong or directional light is at the source, it's not hard to manipulate it. We talked last month (May 2004, "Flash Photography 101," page 80) about the value of softening the light from flash units by passing it through translucent diffusers, or by bouncing it off walls, ceilings, and other reflective surfaces. One trick professionals use to illuminate part of the face without letting the rest appear too shadowed is to position a reflective surface opposite the main light source, so its reflected rays fill in the other side. Even makeshift reflectors, such as poster board and crumpled aluminum foil, can work well, while gold-colored material will also give the skin a warm tone.

Variations in lighting, both natural and artificial, can produce an almost infinite range of effects, so don't be hesitant to experiment. One evocative shot is easily worth a dozen that don't quite work.

Symbiosis

We haven't yet touched on one of the most vital tools any photographer can employ when shooting portraits: good rapport with the subject.

The fashion photography of Helmut Newton is widely praised for its technical brilliance, yet just as widely rebuked for being cold, clinical, and detached. And there's a place for that, as Newton's success and influence can attest.

But the most natural portraits usually emerge from a place of warmth and trust, when there's enough camaraderie between the shooter and the subject that the model can relax and almost forget the camera is present at all.

Striving to put this into practice can help you earn one of the highest praises a photographer can hear: "Wow, you really captured something about me there." 

BY BRIAN HODGE

Adding To Your Digital Camera

Must-Have Accessories

At first blush, digital cameras seem simpler than their film counterparts. There are no pictures to develop, and it's easy to frame shots thanks to bright color LCDs. Also, digital processing puts all manner of special effects at your fingertips. Just choosing a digital camera is a chore thanks to all the choices that are available today, but once you've taken that plunge, be aware that your work has just begun.

Despite the developments in technology, one thing standard cameras and digital cameras will always have in common is an abundance of optional accessories. Digital camera owners have access to a variety of additional accessories that film camera owners have no need for, further complicating decisions when purchasing a digital camera. Most retail salespeople are trained to foist a host of extras on customers who purchase any sort of camera, so knowing what is essential and what is not before setting foot in a store or clicking that Buy Now button online can save a lot of money.

Memory Media

When it comes to consumer-level digital camera technology, higher megapixel ratings equal more resolution, which allows for better overall picture quality. Unfortunately, these large pictures require ever-increasing amounts of memory space for storage, but manufacturers continue to ship digital cameras with paltry 32MB or 64MB memory media that only hold a few pictures when you select the camera's maximum quality

settings (see the "Memory Card Capacities" chart in this article).

One of the best purchases a digital camera owner can make is investing in a better memory card, and there are three major features to consider when comparing media: media type, storage space, and speed.

First, be sure to purchase storage media that is compatible with your camera. Current options include CompactFlash, Memory Stick, SD (Secure Digital), MMC (MultiMediaCard), miniSD, xD (eXtreme Digital) Picture Card, SmartMedia, and MicroDrive media.



A huge memory card, such as this one from Lexar media, may provide more storage than you really need.

If your camera uses CompactFlash media, determine whether it accepts the thicker CF Type II cards, the thinner CF Type I cards, or both. MicroDrives use a CompactFlash Type II shell but use mechanical hard drives instead of solid-state memory. This allows for high capacities



(1GB or more) at relatively inexpensive prices, but MicroDrives are more fragile than standard CompactFlash cards because they use moving parts, and they also tend to be slower.

Some cameras that use Sony's proprietary Memory Stick media also can accept newer Memory Stick Pro media, which has much higher maximum storage capacities than its predecessor. Sony also offers Memory Stick Duo and Memory Stick Pro Duo media, which are smaller versions of the Memory Stick and Memory Stick Pro and require special adapter sleeves to work in cameras that accept standard-sized Memory Stick media.

Your budget should determine the amount of storage space you purchase, as more is almost always better. But there are at least two exceptions. The first is that today's largest media cards can be overkill when used in cameras with relatively low megapixel ratings. For example, Lexar (www.lexarmedia.com) sells 8GB CompactFlash cards for a very high price (\$1,499.99). Used in a 6MP digital camera that produces high-quality JPEG (Joint Photographic Experts Group) images that take up more than 3MB of storage space each, that 8GB card could store more than 2,500 pictures. Average consumers simply don't need that kind of storage capacity.

Some users require memory cards that operate at high speeds, letting them snap pictures more quickly than is possible with slower media. There are unfortunately no industry-standard naming conventions pertaining to memory media speed, so check the specification sheets closely for the card's maximum data transfer rate. Lexar displays numbers such as 12X and 40X on its memory media, where 1X equals a data transfer rate of 150KBps (kilobytes per second). That means the company's fastest 80X cards transfer data at up to 12MBps (megabytes per second), so even cameras with very high megapixel ratings that generate large picture files can shoot faster.

Among the other major companies that produce digital camera memory, SimpleTech's ProX and SanDisk's Ultra lines represent their fastest available products. Be sure your camera can take advantage of the media's high transfer rates before making a purchase, as the faster media carries a price premium that is wasted money if your camera is not up to task.

Memory Media Readers

The process of sending data from memory cards to the computer drains the camera's batteries and causes wear and tear on the camera's data output ports, so memory card readers are among the best accessories available to digital camera users. These devices connect to a computer's USB or FireWire interface ports and have one or more slots to accept one or more types of memory cards. Users leave the devices connected to a PC, remove the memory card from the camera, pop the card into the reader, and use the PC to transfer the images.

Although it is possible to purchase a memory card reader that is compatible with only the type of media used by your digital camera, we recommend

buying a universal reader that is compatible with all formats. That way it is still useful if friends or relatives with different types of media want to transfer images to your PC and likely will remain useful if you decide to upgrade your camera in the future.

Cases

Few digital cameras come with carrying cases, so be sure to budget one into your digicam purchase. This is especially important if the camera has an exposed LCD screen, which can scratch easily. Try to find a case designed specifically for digital cameras, as their pouches generally are designed to hold memory cards, interface cables, and extra batteries instead of film canisters.

Tripods

Even simple point-and-shoot digital cameras can benefit from the steadying effects of a tripod, but that doesn't mean

Additionally, tripods are indispensable for shooting at high zoom levels where even the slightest tremor gets magnified to the point where it can ruin a photo.

Portable tripods that are only a few inches high when unfolded are handy on vacation when you want to make sure everyone gets in the picture. Get the extra height you need by perching the tripod on top of a car, fencepost, or any other convenient object, and let the camera's self-timer or remote control (assuming it has one) do all the work.

Batteries

The internal electronics and ever-larger LCD viewfinders incorporated into digital cameras require a lot of power, so rechargeable batteries are a good investment.

An increasing number of digital cameras, particularly high-end models, come with rechargeable battery packs built in. Salespeople may push for you to purchase an additional rechargeable battery

pack at the time of purchase, but only consider doing so if you know you will use the camera a lot. A rechargeable battery pack's ability to hold a charge gradually deteriorates over time, especially if it uses Li-Ion (lithium-ion) technology. After 18 months to three years (depending on the type of battery), that "new" replacement pack you purchased with the camera and left in a drawer becomes useless.

Many digital cameras still use AA batteries, and

while disposable alkaline or lithium batteries seem cheap in the short-term, today's rechargeable NiMH (nickel-metal hydride) are a much better long-term bargain. Because of the way digital cameras draw power and the amount of power they require, disposable alkaline batteries last only a few hours in most digital cameras. NiMH batteries are much better at delivering the sustained

Average File Size	Memory Card Capacities					
	32MB	128MB	512MB	1GB	4GB	8GB
1MB	32	128	512	1,024	4,096	8,192
2MB	16	64	256	512	2,048	4,096
3MB	10	42	170	341	1,365	2,730
4MB	8	32	128	256	1,024	2,048
5MB	6	25	102	204	819	1,638
6MB	5	21	85	170	682	1,365
7MB	4	18	73	146	585	1,170
8MB	4	16	64	128	512	1,024

Serious shutterbugs who take large pictures with their digital cameras will need a sizeable media card to store their photos, but those who use smaller image files can get by with a much smaller card.

everyone needs one. The first thing to consider is how much you'll use the tripod, because generally they are not easy to carry around or to use for the type of spontaneous picture taking most digital camera owners engage in. On the other hand, if you plan to use the camera to take shots in dim light, at night, or in any other environment that requires long exposure times, a tripod is a must.

Are Extended Warranties Worth It?

Many retailers offer extended warranties on all electronics items, including digital cameras, that don't always deliver the peace of mind promised by the salesperson hawking them. The golden rule is to never listen to what the salespeople say about these warranties. Get a copy of the agreement in writing and check it closely for loopholes. Accidental damage often is not covered, and accidents are a big problem with cameras, as they are often carried around and used outdoors. Also, be aware that many extended warranties give the retailer the right to replace the damaged camera with an equivalent model if repairs are impossible or deemed too expensive. Generally this is a good thing because it lets you upgrade to the latest technology "free," but this policy works against those who have invested a significant amount of money in accessories that won't necessarily be compatible with the replacement product. ■

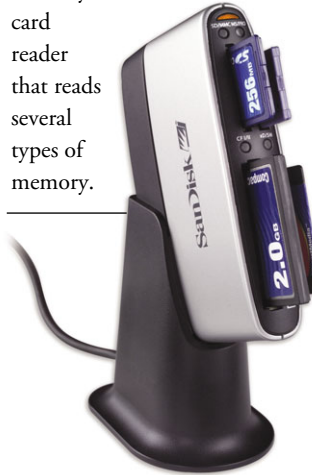
power digital cameras demand and, in our experience, can last several times as long as an alkaline battery before requiring a recharge.

When comparing rechargeable AA batteries, take a close look at their mAh (milliamp hour) capacity ratings. Battery usage varies from camera to camera (and also varies depending on how the camera is used), so there is no way to tell exactly how long a particular battery will last. But when it comes to mAh ratings, higher numbers are better. Buy rechargeable batteries that have 2,000 mAh capacities or more for long-lasting performance. The highest-capacity models from companies such as Maha Energy (www.mahaenergy.com) and

CTA Digital (www.ctadigital.com) have mAh ratings from 2,200 all the way to 2,400 and are excellent for use in digital cameras. Buy a spare set to use while the others are recharging, and you'll never be at a loss for power.

No matter what type or brand of rechargeable batteries you purchase, it's imperative to use them with a good charger. Maha Energy, for example, makes superb chargers equipped with circuitry that optimally charges batteries, and we've used one of the company's Powerex MH-204F chargers for over a year with consistently excellent results. Poor chargers do not recharge batteries to their highest capacities and can even damage batteries, so don't go with the cheapest model.

It's best to buy a memory card reader that reads several types of memory.



Mini-B male connector on the other end that attaches to the camera. Don't make the mistake of purchasing a cable with a Type B male connector (generally used for scanners, printers, and sometimes camcorders) or two Type A connectors.

Also, USB products typically are listed as either USB 1.1 (Full Speed), which has a maximum data transfer rate of 15MBps, or USB 2.0 (Hi-Speed), which has a maximum data transfer rate of 60MBps. It is important to note that fully compliant USB 1.1 cables will work with a USB 2.0 device at full USB 2.0 speeds, so there is no need to upgrade to Hi-Speed compliant USB cables if you already have older USB 1.1 cables sitting around.

Interface Cables

If the camera you purchase does not come with a cable that connects it to a PC or printer, expect to shell out \$5 to \$20 or more for the cable. Most digital cameras use USB cables, while a few use FireWire cables. Most digital cameras also can output videos or images to a television by using a special interface cable that attaches directly to the TV. Contact the company or talk to the salesperson to find out if the camera you intend to buy comes with all of these input and output cables, as the TV interface cables, in particular, are expensive to replace.

When purchasing cables, the main thing to pay attention to is what types of plugs they have on each end. USB cables have several types of ends, and you need to find a cable that attaches to both your camera and PC. Most digital cameras use mini USB cables, which have a standard Type A male connector on one end that attaches to the PC and a much smaller

Just the Beginning

This article covers the essentials that every digital camera owner needs to consider, but there are many other optional accessories commonly used by pros that can help novices get much more use out of their cameras—and take much better pictures in the process. Most digital camera manufacturers sell lens adapter kits that let users take advantage of wide-angle and other popular lenses, and some sell waterproof shells that let users take their camera snorkeling or SCUBA diving. You can buy an external flash to help out in low-light situations, and products such as light meters that have been used by film photographers for years work just as well with digital cameras. When it comes to taking pictures, creativity is the key, and the right tools can turn nearly any setting into a creative opportunity. 

BY TRACY BAKER

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photograph by Angie Hill

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Camcorder Pocket Rockets

Videos In The Palm Of Your Hand

Smaller, faster, better, more: it's the mantra of consumer electronics. The past and future development of digital camcorders is no exception. We're not too far removed from the days of VCR-sized "luggable" cameras. In the meantime decreases in the size and cost of camcorders have been matched only by increases in their image quality and editing flexibility. If you're looking for high-quality video in a palm-fitting package, check out the latest digital camcorder technologies.

Though we all know it's nice to have the latest and greatest things, we also know that nothing comes without a price, both literally and figuratively. For a long time, a smaller camcorder came at the expense of features and image quality. Though less true today than in the past, there are still trade-offs to be made. For any camcorder purchase, consider its resolution, media storage and memory, output and editing options, and accessories.

Those rules apply to the new breed of tiny digital camcorders, but there are additional things to keep in mind. As camera sizes shrink, image stabilization becomes more important. Lighter and smaller models move around more easily, accentuating your unsteady hand. Image stabilization in small camcorders is becoming more and more common: Don't even think about buying a micro model without it. As camera prices increase, you'll also find different kinds of stabilization. Electronic image stabilizers counteract lens movement after the camcorder captures the video using

complicated algorithms to correct the video stream. Optical stabilization actually operates on the lens itself, ensuring a steadier image feed to the video sensor. Also pay attention to the size and quality of a digital camcorder's LCD screen and viewfinder. Smaller cameras have less space for such shooting aides and are often harder to operate effectively.

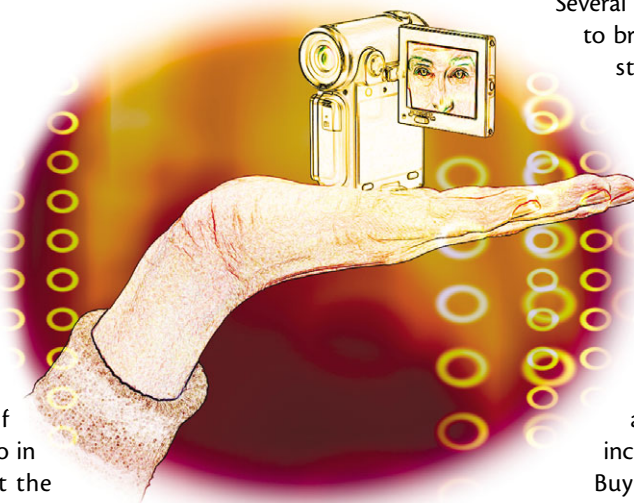
Recording formats and editing are also an issue with the new breed of small digital cameras. Earlier models, which relied mostly on digital 8mm media, were backward compatible with 8mm and Hi8 analog formats so you

could play analog videos through your digital camcorder. Subsequent (and smaller) formats, such as microDV, aren't compatible with these previous formats, and new or proprietary technologies always involve the risk of being stranded with footage no equipment can read. Most digital camcorders also include still-picture options, though still photography is often a low-quality afterthought. Several small models, however, attempt to bridge the gulf between video and still photography. The Samsung SC-D5000 (\$1,299.99; www.samsungusa.com) is most notable, combining a 680,000-pixel video CCD (charge-coupled device) with a sharp 4.13MP (megapixel) still camera. The model includes separate lenses and sensors for each function, and manages to remain light (less than 20 ounces) and trim (5.5 inches high x 3.2 inches wide x 3.8 inches deep).

Buying a smaller digital camcorder also means you'll have to choose among formats. A variety of new technologies are pushing the envelope toward ever-smaller and ever-more powerful devices. We summarize four such technologies below, discuss their most pertinent features, and provide examples of leading models in each category. The list isn't exhaustive, but it's a good place to begin if you're leaning toward buying a small digital camcorder.

MiniDV

The MiniDV (Digital Video) format is the most common small format among digital camcorders. MiniDV cassettes are smaller



The Samsung SC-D5000 combines a MiniDV camcorder with a 4.13MP still camera. It piles two lenses, two sensors, and two types of storage media into a single small chassis.



The diminutive PV-GS50S (\$599.95) from Panasonic pushes the limits of "ultra-compact." It's just 3.3 inches high x 2.6 inches wide x 4.4 inches deep.

than the 8mm variations and are less than a tenth the physical size of a VHS tape. The MiniDV format can record video at near-DVD quality (about 520 lines of resolution) and can record CD-quality audio at the same time. New high-definition MiniDV camcorders reach 720p (progressive) resolutions with the same media. MiniDV cassettes generally hold 60 to 90 minutes of SP (standard play) footage.

As with most cameras, shooting and zoom options are important in MiniDV models. Be sure to distinguish between optical and digital zooms. Optical zoom is a true focal-length adjustment, whereas digital zoom is a pixel trick in which the camera simply enlarges the individual pixels of an image. However, digital zoom affects video quality less negatively than still-image quality, so you don't have to avoid using it quite as stringently. Most Mini-DV cameras also include flash memory slots, for either SD (Secure Digital) or Memory Stick cards. Most models dedicate MiniDV for video and flash memory for stills, though. If camcorder size is important to you (and you wouldn't be reading this article if

it wasn't), understand that not all MiniDV camcorders are diminutive.



Canon's ZR80 and Optura Xi (\$399/\$1,499; www.canonusa.com) epitomize the range of MiniDV models.



The Hitachi DZMV580A records digital video directly to 3-inch DVD-R or DVD-RAM discs, encoded in MPEG-2 format. It also stores still photos on DVD-RAM discs or removable MMC/SD memory cards.



"Micro" fits the size if not the price. Sony's newest proprietary technology, MicroMV, is compact but expensive. The DCR-IP1, for example, is the entry-level model at \$1,200.

Some models (such as Panasonic's PV-GS50S) are truly tiny, but other camcorders are no smaller than competing Digital8 or analog models.

MiniDV camcorders, without exception, include outputs for direct playback on a television or other display. You can also transfer footage to a computer (normally through a FireWire connection) for editing, encoding, and recording to disc. Be aware, though, that converting a MiniDV video clip to an MPEG-2 (Moving Picture Experts Group-2)-encoded DVD is a thorny one. It can take awhile to transfer large video files to your PC, plus you'll need to use your video-editing software to edit and encode the video. And recording DVDs can take up to several hours, depending on the length of the video and the abilities of your PC and DVD recorder. MiniDV videotapes are common and inexpensive; it might be easier to simply connect your camcorder to a TV and play the tapes through the camcorder or to store and view them on a computer with whatever editing software is included with the camcorder you buy.

MiniDV camcorders have the broadest price range (and the most diverse feature options)

among the formats we cover here. Entry-level models cost between \$350 and

\$450, though higher-end units sell for several thousand dollars or more. Expect a MiniDV camcorder to have at least a small LCD screen, basic image stabilization, and A/V outputs, though you'll pay more for larger sensors, multimedia card options, higher still resolutions, and color viewfinders.

MiniDVD

MiniDVD is just what it sounds like: a format that records video on small DVDs. The discs are smaller in diameter than regular DVDs (3 inches in diameter) and just as thin, so cameras based on the technology are equally svelte. Most models measure around 2.5 inches x 3.5 inches x 5.5 inches and weigh between 1 and 2 pounds. MiniDVD also records at 500 lines of resolution, though a MiniDVD's recording time is just half an hour.

MiniDVD camcorders record the video to DVD-R, DVD-RW, or DVD-RAM media, encoded in the MPEG-2 format. This combination makes the DVD-R/-RWs from MiniDVD camcorders the most user-friendly format on the market. You can pop the discs into just about any DVD player and view them right away. Most standard DVD players can recognize and play a DVD-R as soon as you finalize the disc (either with the camcorder or your PC). You can easily edit video from a DVD-RAM using your PC. DVD-R is a write-once format, and DVD-RAM and DVD-RW are rewriteable. MiniDVD camcorders also record each session as a separate track, making it possible to jump directly from one recorded section of a disc to another, rather than rewinding or forwarding through a tape to find a specific segment.

Most MiniDVD models also include outputs for displaying footage on a television. All include the ability to view or export video to a PC, and MPEG-2 compression creates relatively small video files, which makes transferring video quick and easy without sacrificing image quality.

MiniDVD camcorders normally can record to more than one format (some

combination of DVD-R, DVD-RW, and DVD-RAM) and may include slots for flash memory onto which you can store still images and short video clips. MiniDVD has suffered from a chronic shortage of media availability, though, so stock up on discs when you can find them. A MiniDVD camcorder usually carries a suggested retail price between \$800 and \$1,000, though online retailers sell older models for as low as \$600. You'll pay more for higher still-image resolution and more recording format options, as with the Hitachi DZ-MV580A (\$899). Hitachi's newest model takes 1.2MP stills and records widescreen video in DVD-R and DVD-RAM formats.

MicroMV

MicroMV is the latest small-form-media challenger to emerge. A proprietary format developed by Sony, MicroMV sports tapes about a third the size of MiniDV cassettes. Current models are about 4 inches tall and weigh less than a pound (the lightest is a mere 8 ounces). It's the most compact format on the market. And it doesn't sacrifice power. MicroMV models record at 520 lines of resolution (the same as MiniDV and other digital formats), and have 90 to 120 minutes of recording time.

MicroMV uses the standard MPEG-2 compression codec, which is DVD's native format. Using MPEG-2 makes MicroMV footage more compact (MPEG-2 is a very efficient compression method) and easier to record to a DVD on your PC (the footage doesn't have to be converted before recording to the disc). Those features, in turn, make it easier to transfer, edit, store, and distribute your movies. MicroMV models also tend to have more built-in memory (64KB instead of 16KB), enabling more on-screen editing and indexing options.

MicroMV isn't compatible with the Mac OS, so you won't be able to transfer your videos to a Mac. But you can connect your MicroMV camcorder to a television.

There are only a few MicroMV devices available, so feature options are more

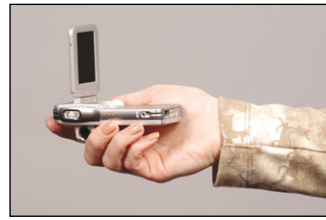
limited. And the technology's proprietary nature entails hitching your ride to Sony's wagon. Such a strategy turned out fine with the Memory Stick, but not so well in the case of Betamax. Which one MicroMV will turn out to be is anyone's guess.

MicroMV cameras are some of the most expensive models in this category. Prices range from \$1,200 to more than \$2,000. The most basic MicroMV option, the Sony DCR-IP1, includes Memory Stick support, a 1MP still-image sensor, and standard shooting options, such as optical and digital zoom, image stabilization, and various picture effects, for \$1,200. Sony's higher-end DCR-IP220 Network Handycam, on the other hand, offers a 2MP still camera and Bluetooth network connectivity for \$2,000.

Flash Memory

As solid-state memory (also known as flash memory) becomes more affordable and supports larger capacities, manufacturers are beginning to take advantage of it for more than just backup storage or still-photo recording. In fact several new models rely on flash memory exclusively to store video footage in addition to still photos.

Panasonic's D-snap line (www.panasonic.com), the category's pioneer, stores up to 20 minutes of video on a 512MB SD card (included). The 2.5-inch LCD screen takes up most of the camera's body; the entire device is just 3.5 inches x 1.3 inches x 2.6 inches and weighs less than 6 ounces. Panasonic even manages



The D-Snap AV50 (\$399.99) from Panasonic is one of the first models to rely on flash memory storage exclusively.



Sharp's new VL-Z800 offers a widescreen shooting mode, for that real home cinema feel.



The first consumer-level high-definition camcorder, the JVC GR-HD1 uses regular MiniDV cassettes.

to pack image stabilization, a 10X optical zoom, and a variety of other encoding options (MPEG-2, MPEG-4, still image) into the tiny camcorders.

You can transfer files to a PC via a USB connection or through an SD card reader. Higher-end models in the D-snap line include video output options, and the least expensive model includes a flip-up LCD screen for viewing on the go.

Panasonic's D-Snap line ranges from \$299.99 for the no-frills SV-AV25 to \$999.95 for the higher-end SV-AV100 camcorder, with \$400 models in between.

The Future

The future of digital camcorders holds the promise of even more innovations. The video resolution in small cam-

corders is already increasing across all formats. Sharp's new VL-Z800 (\$699.95; www.sharppusa.com/SharpHome) offers a 1.3-megapixel CCD and a 16:9 mode. High-definition models, such as the JVC GR-HD1 (\$3,500; www.jvc.com), first hit retail shelves last year. Though the size of MiniDV, MicroMV, and MiniDVD media creates a limit as to how small the recorders can get, solid-state (flash memory) technology offers ever-smaller-sized camcorder possibilities.

Wherever you think camcorders are going, and whichever format you think will emerge victorious, it's an exciting time for digital videography. We've come a long way from yesterday's shoulder packs to today's pocket rockets, and the best is yet to come. **CE**

BY GREGORY ANDERSON



The Company That Wired the Network Now Unwires it

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Sounding Off, Part I

Turn Your Computer Into An Audio Workstation

It wasn't too terribly many years ago that the idea of creating serious audio work outside a professional studio was almost unthinkable. But as they've become more powerful, PCs have shattered that barrier along with so many others. There will always be a need for skilled audio engineers and pro studios, of course. Even so, when supplemented with the proper hardware and software, your computer can make audio work, if not quite as simple as word processing, at least as accessible.

You can do almost anything that involves sound design, editing, and recording on a home computer: Composing music. Recording narration for presentations. Creating sound effects. Scrubbing hiss and other noise from video recordings. Adding music, sound effects, and narration to video. In fact, step into most pro studios and you're likely to see these tasks being performed on the PCs or Macs you may have already or have been trying to justify upgrading to.

In this two-part series, we'll cover the ins and outs of setting up your own audio workstation. This month we'll look at the kinds of hardware and software you'll need, depending on what you want to accomplish. Next month, we'll get deeper into using these items in the course of accomplishing various practical tasks.

Chain Of Tools

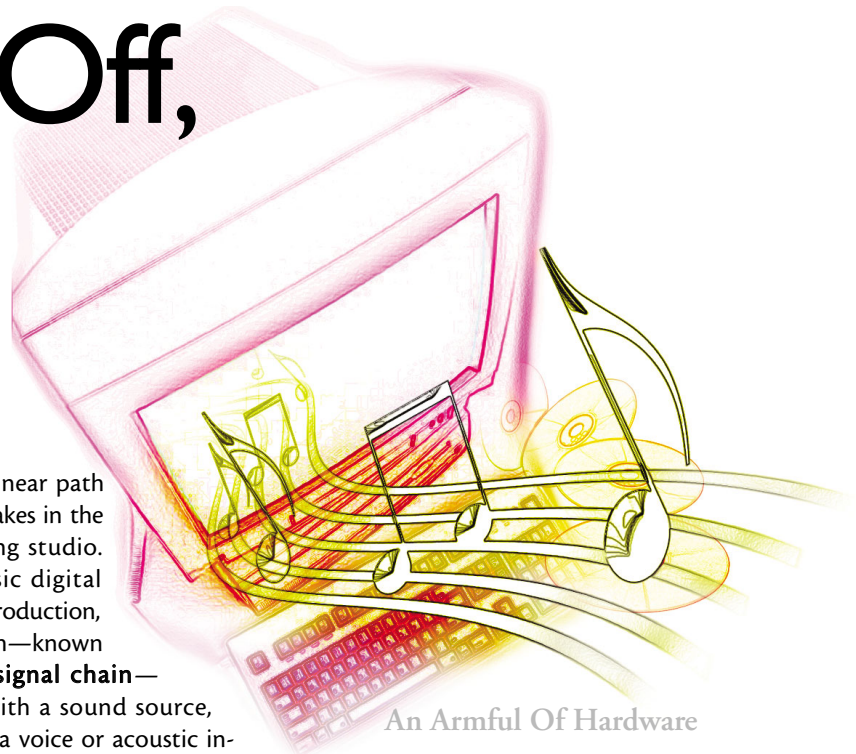
If you've never thought much about audio production before, it helps to keep things straight by focusing on the more

or less linear path sound takes in the recording studio. In a basic digital audio production, this path—known as the **signal chain**—starts with a sound source, such as a voice or acoustic instrument picked up by a microphone, or an electronic instrument such as a keyboard synthesizer. Next, this source audio is cabled to an ADC (analog-to-digital converter) or soundcard, so it can enter a computer. Inside the computer, the appropriate software records the source audio. Finally, so you can hear what you're doing, you need a monitoring system, either external speakers or headphones.

Audio's endless flexibility allows for variations on this basic scheme. Signals are often subjected to extensive effects processing at various stages (echoes, distortion, etc.). Many electronic instruments output digital signals, bypassing the need for an ADC. And with virtual instruments, it's possible to create elaborate musical productions, even complete symphonic orchestrations, entirely within the software domain.

This kind of setup may be overkill, but if you're working solely with audio that's been recorded elsewhere, you may just need a subset of the above signal chain.

So let's break each stage down further and see how (or if) each one fits into your plans.



An Armful Of Hardware

At each signal stage, there can be dozens, maybe even hundreds, of products that will meet your needs, and something to fit within most budgets. For each category, we'll list a few prominent manufacturers. Most of them could fall under multiple categories, but we'll avoid duplications to furnish as many as possible. Where we mention specific products, the prices are all MSRPs (manufacturer's suggested retail prices), but keep in mind that you'll often find street prices substantially lower.

Microphones and accessories. To be amplified or recorded, an acoustic source (voice, acoustic guitar, flute, and so on) must be picked up by a microphone. Your PC may have come with one, but it's likely a cheap, plastic thing, suitable only for informal uses. For more critical tasks, there are several types of mics, but the two most common are dynamics and condensers.

Dynamic mics are what we usually see onstage. They're durable, fairly inexpensive, and have limited sensitivity to very high frequencies and high SPLs (sound pressure levels). Most make good all-purpose mics. The Shure SM57 (\$146; www.shure.com/microphones), for example, is a ubiquitous presence in studios of all sizes.

Condenser mics are more delicate and complex in design, delivering a sound with more detail and sheen. Because of their increased sensitivity to faint SPLs and high frequencies, they require a quiet, controlled recording environment. Here, again, you'll find two basic types: Small-diaphragm condensers are frequently used for sounds with lots of high frequencies, such as strings, while large-diaphragm condensers are commonly used for vocals.

In addition to its type, a microphone is also identified by its response pattern. An **omnidirectional** pattern means that the mic picks up sound equally well from all directions. A good use would be recording a vocal ensemble arranged in a tight circle. Mics with **cardioid** and **hypercardioid** patterns tend to hear only what's in front of them, rejecting sounds coming from behind; with careful positioning, they can be useful for shutting out unwanted sounds, such as a computer fan.

In addition to Shure, other microphone manufacturers worth checking out include AKG Acoustics (www.akg.com), Marshall Electronics (www.mxlmics.com), and Rode (www.rodex.com.au).

Regardless of type, microphones put out a low-level signal that needs to be boosted before you can use it. That's the job of a **preamplifier**, a device you plug the mic into that outputs the boosted signal. For condenser mics, preamps also provide phantom power, a small electrical current (usually 48 volts) that they need to operate. Popular preamp manufacturers include ART (www.artproaudio.com), Focusrite (www.focusrite.com), PreSonus (www.presonus.com), and Studio Projects (www.studioprojects.com).

Finally, if you're going to use a microphone, get a stand: either desktop or floorstanding. You definitely don't want to record the rumblings and fumbings of a handheld mic.

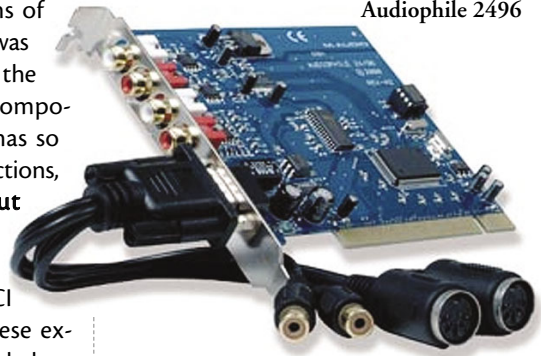
Audio interface. The audio interface is the gateway between the outer world of sound and the inside of your computer. A few years ago, about your only option for routing audio into a computer (at home, that is, not in pro

studios using mixers with dozens of channels and built-in preamps) was a traditional soundcard. Because the faceplate of a PCI (Peripheral Component Interconnect) soundcard has so little room for a variety of connections, many setups included **breakout boxes** and **breakout cables**—an external chassis or bundle of cables that sprouts from the PCI card at a single connection. These expansions can provide a well-rounded assortment of jacks: analog 1/4 inch and 1/8 inch, digital coaxial and/or optical, **MIDI (Musical Instrument Digital Interface)**, a communications protocol used by electronic instruments and other devices), and so on. Another workaround was to pack the equivalent of a breakout box into a unit that fit into a spare drive bay.

Although these options are still viable, a range of external USB and FireWire units, designed for various needs, have joined them. Take, for example, M-Audio's Audiophile family of interfaces. The Audiophile 2496 (\$199.95; www.m-audio.com) was initially one of several PCI soundcards the company produced. After its excellent ADCs (up to 96KHz and 24 bits) and stable drivers made it a great success, M-Audio expanded the line with the Audiophile USB (\$249.95) and, early this year, the FireWire Audiophile (\$349.95). Each provides inputs and outputs for analog and digital audio, plus MIDI. The external units also support headphones. Yet another unit, the FireWire 410 (\$499.95), expands on those features with two built-in microphone preamps.

Many home studios also use soundcards from Creative (www.soundblaster.com) and Echo (www.echoaudio.com). Lexicon's Omega Studio (\$529.95; www.lexiconpro.com) is a good desktop system that also includes multitrack recording software.

One advantage of USB and FireWire interfaces is that you can easily swap them among multiple desktop and notebook computers. Whichever option you



Audiophile 2496



Audiophile USB



FireWire Audiophile

M-Audio's Audiophile family of internal and external soundcards offers similar, although not identical, audio and MIDI connectivity options.

prefer, you can likely get by with an interface that handles basic stereo-in/stereo-out, unless you have a specific need for routing several channels simultaneously.

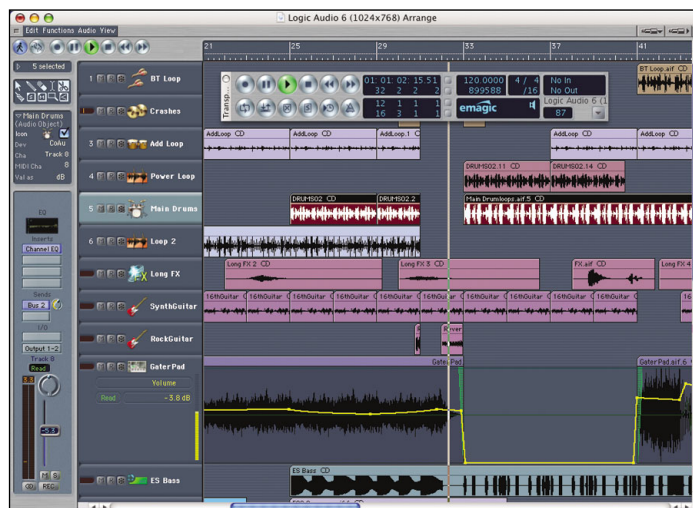
Computer. You've heard it before, and it holds just as true now: You can never have too much processing power, memory, and storage space. Whatever software you intend to use should list suggested system requirements, but it will pay off in stability and speed to exceed them, even if all you do is add extra RAM.

Obviously, the more you ask of your system, the more powerful it needs to be. A basic stereo audio editor might require only a first-generation Pentium

or early PowerMac. Multi-track sequencers using virtual instruments and other plug-ins often demand no less than a Pentium III, Pentium 4, or a PowerMac G4. If your computer is already handling digital video with few or no hiccups, you shouldn't have trouble adding audio work to the mix. Here are a few tips:

- **Hard drive speed matters.** If yours spins at less than 7,200rpm, and you plan to work on multi-track projects, consider upgrading to a faster drive to keep from bogging down with crashes or choppy, distorted audio playback.
- **Audio (and video) gobbles up storage space.** One minute of CD-quality stereo audio eats just under 10MB, so if your computer has less than 40GB of hard drive space, it's probably time to add a higher-capacity drive.
- **Add a dedicated drive or create a drive partition just for audio/video files.** Lots of edits lead to file fragmentation, and fragmentation leads to reduced drive performance, as the drive head scurries around to put the pieces together. Segregating the audio/video files on their own drive or partition will let you use a drive utility to defragment them frequently and efficiently, and it'll optimize performance.

Monitoring system. To listen to your work sessions, whether you need to augment your computer's existing speaker system depends on where you're going to play the audio. If you're working on material strictly for home listening—your own music, family video—you may be able to get by with monitoring on your PC's multimedia speakers. But if you'll be mass-producing something, and your work is destined to be played on many systems, it's critical to produce this work on audio monitors that are designed



Most sequencers look something like this, with a central window for arranging blocks of audio and MIDI data, which you can manipulate in a variety of other windows. Shown here: Emagic's Logic Audio.

to provide as accurate a sonic picture as possible.

Multimedia speakers often emphasize high and low frequency ranges to give them a punchier sound; others lack an adequate bass response. If you're working in a **closed system**—that is, you intend to play the audio only on the same speakers used for recording and editing—your speakers' accuracy doesn't much matter. What sounds right during production is what you'll hear later. In contrast, if you're doing more serious audio production, you should work while listening to **reference monitors**, studio-specific speakers that have a fairly flat response across the entire audible frequency spectrum. Audio prepared on reference monitors is likely to translate more consistently to many different consumer systems.

For home use, **nearfield monitors** (small-cabinet speakers intended for small studios) should suffice. Passive models require a separate amplifier. Active models have built-in amplifiers and you can plug them right into your audio interface outputs. In small spaces such as home studios, active monitors are often the more convenient, consolidated choice because you don't have to use an external amp and the extra speaker cabling it requires. Also, make sure your speakers or reference monitors are

magnetically shielded, so they don't interfere with your computer screen.

When monitor shopping, try Behringer (www.behringer.com), Event (www.event1.com), Roland (www.roland.us.com), and Tannoy (www.tannoy.com).

A Fistful Of Software

If you think there are a lot of hardware options to choose from, just wait until you hit the software aisle. As computer prices have fallen and processing power has increased, desktop and even notebook PCs have

become increasingly viable replacements for entire rooms of gear.

For an overview of the enormous variety of stuff out there, drop by the Shareware Music Machine (www.hit-squad.com/smm), a site that features dozens of categories of programs large and small. You can download not only freeware and shareware titles, but also demos of some of the programs mentioned below.

Audio/MIDI sequencers. These are deep programs that, when used with audio interfaces and monitors, can transform a computer into a full-blown recording studio. Within a single environment, you can record multiple tracks of audio and MIDI data to control external sound devices. Sequencers also serve as plug-in hosts for software instruments. During and after recording, you can edit, apply plug-in effects, mix, and polish a production until it gleams.

You'll find that most sequencers are available in more than one version, so you're not buying more program than you actually need. Steinberg's Cubase (\$149.99 and up; www.steinberg.net) runs on PCs and Macs alike. Cakewalk's Home Studio and SONAR (\$129 and up; www.cakewalk.com) run on PCs only. MOTU's Digital Performer (\$795; www.motu.com) and Emagic's Logic (\$299

and up; www.emagic.com) are Mac-only.

Audio editors. Good editors are the Swiss army knives of audio. Although most sequencers contain a basic audio waveform editor, dedicated programs typically offer a much deeper level of control and analysis. In addition to recording (stereo only, usually), they also offer extensive ways to manipulate sound with effects and other forms of processing, not only through built-in features, but also by hosting third-party plug-ins. They may even let you clean up audio that's grungy with clicks, hisses, and other noises.

For Macs, except for limited-function shareware titles, the dominant editor is BIAS Peak (\$499; www.bias-inc.com), which is also available in a light version, Peak LE (\$99). Peak DV (\$199) is a version specially configured for editing the audio from digital video.

For PCs, the top choices are more varied. Sony's Sound Forge (formerly from Sonic Foundry, \$499.95; www.sony.com/media/software) and Steinberg's WaveLab (\$599.99; www.steinberg.net) are mainstays in the audio industry. Adobe recently acquired another popular editor, Cool Edit Pro, and renamed it Audition (\$299; www.adobe.com).

We'll be taking a closer look at working with editors in Part 2, next month.

Virtual instruments. In the great sweeping tide of audio software, virtual instruments are the crest of the wave, covering a range that includes pianos, synthesizers, samplers, guitar emulators, beatboxes, and instruments that don't even have hardware counterparts. Some operate as plug-ins within host sequencers; others offer a choice between plug-in or standalone modes.



Atmosphere



Absynth



StormDrum

Software instruments have become extremely sophisticated and powerful in the last few years. From top to bottom: Spectrasonics' Atmosphere, an instant gratification synthesizer drawing on 3.7GB of sound data; Native Instruments' Absynth, a synth programmer's dream; and East West's StormDrum, which uses different interfaces to play/manipulate percussion loops and individual drum sounds.

You can play most software instruments via MIDI, so you need some facility with a piano- or synth-type keyboard. But even a small USB controller, such as M-Audio's two-octave Oxygen8, will work.

Some instruments take a traditional approach, or even replicate vintage gear, such as Arturia's Minimoog V (\$199; www.arturia.com) and G-Media's M-Tron (\$99; www.gmediamusic.com), which dead-on nail both the character and the quirks of the Minimoog synthesizer and the Mellotron tape-playback keyboard. Others, such as Native Instruments' Aabsynth (\$339; www.native-instruments.com), go far beyond the capabilities of hardware synths by taking advantage of the computer's visual environment to provide deep, precise sound programming capabilities. Still others, such as East West's Quantum Leap Symphonic Orchestra series (\$295 and up; www.soundsonline.com), bundle multi-gigabyte libraries of everything you need to replicate an entire orchestra. The cutting-edge instruments and sound libraries from Spectrasonics (www.spectrasonics.net) are popular in music, film, and TV; you may have heard them every day for years.

Can't play an instrument? Not a problem. Programs such as Sony's Acid (formerly from Sonic Foundry, \$499.95; www.sony.com/mediasoftware) and Apple's new GarageBand (\$49 as part of the iLife suite, free with new Macs; www.apple.com/ilife) use sequencer-like interfaces in which you can make intricate arrangements of music based on prerecorded loops.

Standby

That's enough shopping for anybody for one month. In the July issue, we'll be back with Part 2 to actually get our hands dirty with some of this stuff. So if you don't know a zero-decibel threshold from a zero-crossing, see you in 30. 

BY BRIAN HODGE

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108 Mbps
PC Card



WAG511
108 Mbps
Dual Band
PC Card



WAG311
108 Mbps
Dual Band
PCI Adapter



WG602
54 Mbps
Access Point



WG511
54 Mbps
PC Card



WG311
54 Mbps
PCI Adapter



WGR614
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Router



WGE101
54 Mbps
Ethernet Bridge



WG121
54 Mbps
USB Adapter

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CE & Healthy Eating

Unhealthy R Us

We are the wealthiest society in the world. Most of us enjoy considerable leisure time, good living conditions, an unprecedented variety of entertainment venues, and remarkably cheap, plentiful food. Yet we are also an extremely unhealthy society. According to the American Obesity Association, 127 million adults in the United States are overweight, and more than half of these people are obese or severely obese. A study funded last year by the U.S. Centers for Disease Control and Prevention noted that unnecessary weight is responsible for \$93 billion in annual medical bills. This was even larger than the annual medical price tag of \$76 billion blamed on smoking, in a similar national study done several years ago. Dave Grotto, director of nutrition education at the Block Medical Center in Evanston, Ill., and spokesperson for the American Dietetic Association, is blunt about the problem. "We are becoming fatter as a nation, and it's forcing insurance companies and health care providers to finally look at the main cause of a lot of disease. It has to do with a lot of decisions we make not only with our pocketbooks but with our forks."

We don't only eat too much. We eat poorly, as well. We are fed to the point of bursting but starved for nutrition. In a telephone survey conducted by the University of Michigan Health System,

six out of 16 hospitals that made the 2001 *U.S. News & World Report's* ranking of "America's best" had fast food restaurants on their premises, and four had contracted with two fast food chains. In 2000, research firm Samuels & Associates discovered in an extensive survey of California public high schools that more than half sold brand-name fast foods.

More than 72% of the responding school districts permitted fast food and beverage advertising on the premises. According to Eric Schlosser in "Fast Food Nation," we Americans spend more money per year on fast food than we do on personal computers, new cars, or higher education.

Poor eating habits are only part of the general health malaise facing Americans, but they are a major part that is under our personal control. We may not always be able to choose the kind of environment we live in or the leisure activities available during our off-hours, but we can definitely determine what and when we eat. And to help us improve our eating habits, there are now electronic aids that make the task far easier.



Handheld Devices & Dietary Health

One of the most exciting dietary developments in recent years has been the appearance of portable handheld devices designed to calculate nutritional values on-the-fly. They range in price and ability from relatively simple calorie counters, less expensive than a dinner at a good restaurant, to calculators for less than \$100 that will track your fats, carbs, proteins, sodium intake, and more for an entire month. All of these devices come with prearranged databases of foods, but they also let you permanently or temporarily enter new foods and their nutritional values. Some will track averages of your nutritional consumption

for a day, a week, or a month. All are relatively small; if not uniformly pocket-sized, they're still lightweight and easy to transport in a briefcase or fanny pack. Each doubles as a battery-operated calculator, too. Like portable language-translation devices, these handheld nutrition aids give you access to useful information without prememorization or a book for company.

Napuda Technologies NutriCounter

\$129.95

www.nutricounter.com/product.htm



The NutriCounter tracks the calories, carbs, fats, saturated fats, proteins, fibers, sodium, and sugar in more than 2,000 food items—and adjusts according to the portion size you've entered. It also has 400 open locations that you can use to record and store foods and their nutritional information that aren't included, such as a specific manufacturer's frozen lasagna or a local company's fresh bread. NutriCounter displays daily, weekly, and monthly totals

for calories and the average for daily consumption over a user-defined period of two to 30 days. A Today button shows all nutritional categories' totals for that day; a Balance button shows what's left for each day's consumption, based on the goals you've set. You can set goals for each nutritional category, which will cause those categories to blink when you've entered items for your daily dietary intake that exceed those self-imposed limits. Finally, you can indicate the portion of food that you've eaten at a meal, and NutriCounter will adjust its nutritional readout, accordingly.

SPI's NutriGuide

\$49.95

www.nutri-guide.com/index.htm



The NutriGuide has room for only 40 user-defined food items, but there are more than 10,000 (3,500 fast foods) already in the database. The device monitors eight nutritional values: fats, saturated fats, calories, cholesterol, carbs, sodium, fiber, and protein. As with NutriCounter, NutriGuide adjusts nutritional data when you change the food portion you've consumed. It only tracks a weekly average for each food value, rather than a monthly figure; but alone in this group, it calculates dietetic and diabetic exchanges. And just in case you wanted to get those pounds off your cat's paunch or slim down your dog's buns, it also has basic cat and dog nutritional information.

robi Nutrition Assistant

\$29.95

www.nutritionassistant.com



This little device tracks calories, carbs, fats, saturated fats, and protein for 800 foods in its database. It lets you add up to 100 more foods with their related nutritional information. Like other products in this category, the Nutrition Assistant adjusts values for eating portions. It maintains a monthly diary of your food intake, as well, giving daily consumption averages and comparing them to user-defined goals. It's not the most comprehensive handheld nutrition calculator on the market today, but it's the smallest of this group and the easiest to tote.

PICS' DietMate

\$97.50

www.dietmate.com/#



We should also mention DietMate. Like the other products discussed here, DietMate is a pocket-sized computer designed to help dieters. Unlike the rest, it isn't a calorie counter/tracker for everything you eat. Instead, it's a personalized eating, training, and motivational plan. First, you input your height, weight, health history, lifestyle, age, and sex. Then, DietMate customizes its database of recipes and foods (both for eating in and eating out) and recommended exercises. It tracks your intake of calories, fat, saturated fat, cholesterol, and sodium, and it helps prepare diet-conscious shopping lists. As you might expect from a program that seeks a macro approach to health, it comes with a variety of additional motivational tools, including a VHS tape and a cookbook.

Other Electronic Dietary Aids

Handheld dietary computers take a direct approach to eating healthy. They tell you in detail the nutritional value your body absorbs from specific foods and track your consumption over a period of time. But if that's all it takes to slim down

and become healthy, most of us would have long ago agreed on a single diet that meets everybody's needs. The problem is that many factors, such as hormones, personal habits (smoking, drinking, etc.), and even genetic disposition, combine to make each of us unique. One person may need to exercise more rather than eat less. A second may need to work primarily on personal motivation and impulse eating. A third may have to change the times she eats or the balance of proteins to carbs to fats. Eating correctly involves more than just knowing your caloric intake. It means taking stock of the condition of your body and adjusting your diet accordingly.

Fortunately, there are portable electronic devices that can help you accomplish this.

HealtheTech BodyGem 20

\$395

www.healthetech.com/consumer_bodygem.html



Body Gem measures your **RMR (Resting Metabolic Rate)**, which is the number of calories your body burns each day at rest, maintaining normal body functions such as breathing, heart rate, etc. This is a relatively high number for some people, and eating fewer calories in accordance with some diets may unknowingly interfere with their basic health needs. The aim, after all, isn't just to eat less but to eat right and become healthier.

BodyGem is an electronic flowmeter that you can use 20 times. You breathe for five to 10 minutes into a single-use mouthpiece that connects to the device's flow tube. (Use the included nose clip to prevent air exchange except through BodyGem.) The unit beeps when it's completed its measurement. Information online and included with the product helps analyze the numerical result. Once you know your RMR, you'll have another piece of the puzzle in place showing how many calories you burn in a given day and how you use them. Factor in the calories you expend in exercise and

general lifestyle, and you'll have a better understanding of how many calories it's safe to drop from your daily diet.

And how do you determine how many calories you burn in exercise—even if it's nothing more than walking in the mall? Electronic pedometers can help. The standard kind clips on your waistband or a pocket and uses torso movements to determine distance walked and calories consumed.

BodyTrends' Full Function Pedometer

\$20.99

www.bodytrends.com/products/pedometers/bodytrendsfullfunction.htm



The BodyTrends Full Function Pedometer has a number of extra features. It gives you a range of six user-selectable strides to better assess distance covered instead of assuming a single, one-size-fits-all step.

The unit's timer works only when you're in motion and will also calculate speed and steps per minute. It determines calories burned by combining stride length, user-entered body weight, and average speed.

Bodytronics' ProMaxx

\$29.99

bodytronics.com/shop/index.cgi?code=3&cat=6

Another pedometer, the ProMaxx, displays calories burned per minute, and it'll recall current daily, weekly, and monthly caloric totals. These features are useful when you're fatigued and need that boost of spirits that will help keep your body going.



Acumen's PulseMate

\$58.99

www.bodytrends.com/acupul.htm



There are pedometers that measure your heart rate, too. Most of these,

like Acumen's PulseMate, employ a metal clip that fastens painlessly on your fingertip to catch your pulse. This pedometer has an autostride feature, as well, automatically determining the length of your stride (and adjusting the distance covered as a result) according to its frequency. You can set it to Run or Walk mode, overcoming the potential difficulty of a long, running stride being confused by the pedometer for a shorter, walking one because of increased speed.

Sportline Talking Pedometer

\$19.99

www.thesportsauthority.com/product



If you're put off by having to look at a digital readout while exercising, consider the Sportline Talking Pedometer. It's a relatively simple product

without many of the advanced features already discussed, but it'll tell you the number of steps and distance you've walked at the touch of a button.

Tanita

Starting at \$39.99

www.tanita.com/BodyFatFAMILY.shtml#

Percentage of body fat is another important factor to take into account when deciding whether you're healthy. A person who weighs more could well be at less risk for stroke, arteriosclerosis, or heart disease than a somewhat thinner friend whose body-fat-to-muscle ratio is higher due to less exercise and poorer food choices. So how do you measure body fat? There are several methods for doing so. One of the least invasive and time-consuming involves a series of electronic scales by Tanita that double as weight and body fat scales.



They accomplish the latter by using a modified version of Bioelectrical Impedance Analysis: Electrodes in the

foot sensor pads send out an extremely small amount of current, whose electrical resistance in the body determines the relative balance of fat to muscle. The more muscle there is, the less electrical resistance one finds to the current, and the lower the registered charge. This number is combined with user-entered data for height, age, and gender and calculated in the scale's computer in less than one minute. One of the more elaborate of the Tanita units, the BF-556 (\$129.99), stores up to four sets of personal data on its computer chip; four people can quickly retrieve their weight and body fat measurements. These electronic scales aren't extremely portable, but when you're on a family vacation, at the office, or at home, they constitute yet another excellent tool in evaluating your current food and health goals.

Go Beyond Foods

Bear in mind that eating right is only part of the equation, albeit an important part. You have to live right to truly become and remain healthy. This means, at the very least, restful, consistent, and lengthy sleep periods; proper vitamin/mineral supplements; a low-pollution environment; appropriate clothing for different weather conditions; personal advice from a registered dietician; physical checkups with a qualified physician; well-cleaned and attractive working and living conditions; and some form of regular exercise, both for the body and the mind.

That probably sounds like a lot of effort, but the results are worth it. And the nice thing about the portable, electronic dietary aids we've mentioned is that they fit into a synergy of health, drawing from a variety of sources. Returning once more to David Grotto, "These devices allow people to immediately start making wiser nutritional decisions. One device doesn't preclude another or personal assistance. All of these are useful tools that can make each one of us slimmer and healthier in the long run." 

BY BARRY BRENESAL

Fun On The Run

PDAs Aren't Just For Business

PDAs are ideal for keeping track of contacts, maintaining a schedule, and other important tasks, but there's enough processing power inside the cases of today's models to thoroughly mix business with pleasure. Most PDAs ship with color screens, making them viable for displaying images, and even video, in some cases. Compressed digital music formats such as MP3 make it easy to reduce a music collection in size to the point where many tracks fit within the confines of a PDA's memory chip or memory cards. Touchscreens and navigation buttons are also ideal interfaces for playing games, and there are plenty of those available for all makes and models of PDAs.

Taking part in all this fun requires the right combination of hardware and software, so we rooted out the best products in several categories to give you an idea of what is out there. Pocket PCs are much more powerful than Palm OS PDA's in terms of processing power (and memory capacity, in general), so there tend to be more entertainment programs available for the former operating system, but Palm owners still have plenty of options.

Images, Video & Music

Today's PDA's already come with plenty of multimedia software for watching movies, viewing images, and listening to music. Pocket PC users have access to



Microsoft's Windows Media Player 9 series is a solid, free choice for multimedia playback on Pocket PC devices.

Microsoft's Windows Media Player 9 Series for Pocket PC (www.microsoft.com/windows/windowsmedia), while current Palm OS purchasers get free goodies such as Kinoma Player (www.palmone.comus/solutions/personal/kinoma) and RealPlayer for Palm OS (www.real.com/realmobile/palmone.html). Several third-party products are available, however, that provide even more functionality for those who need it.

Firepad Picture Viewer. Firepad Picture Viewer (\$29.95; www.firepad.com; Palm OS) lives up to its name by letting users view images on their Palm OS PDA's that are up to 32,000 x 32,000 pixels in size. Users can zoom in on and pan large images to take in the entire picture, and the software also plays AVI (Audio-Video Interleaved) and MOV (movie) video files. The software handles several popular image formats, including JPEG (Joint Photographic Experts Group), GIF (Graphics Interchange Format), BMP (bitmap), PCX (PC Paintbrush bitmap), PNG (Portable Network Graphics), and TIFF (Tagged Image File Format), and it comes with software for use on a desktop computer that handles image and video format conversions if necessary.

SplashPhoto. Much like Firepad, SplashPhoto (\$29.95; www.splashdata.com; Palm OS and Pocket PC) lets Palm OS and even Pocket PC owners view JPEG images on their PDA's. It comes with software to help users transfer files from their computers, and users can store pictures in the PDA's internal memory or on memory expansion cards for maximum flexibility. SplashPhoto includes a thumbnail viewer that provides an easy way to browse through your collection of



pictures, and the software also lets users wirelessly transmit pictures to other compatible PDA's.



Put that color display to use with SplashPhoto, which also helps organize images.

DVD To Pocket PC. DVD To Pocket PC (\$24.99; www.makayama.com; Pocket PC) converts DVDs into movie files that you can play back on a Pocket PC. It stores up to 100 minutes of video on a single 128MB memory card and can convert movies to play on a device's Landscape Mode to better accommodate widescreen movies.

Movie2MemCard. The main problem in converting video for playback on a Pocket PC is trying to determine how much compression to use to fit the entire video into the available space on a memory card. Movie2MemCard (\$12.50; www.kvmd.com; Pocket PC) takes all of

the guesswork out of this by letting users tell the program how much space is available and then automatically compressing the video enough that it fits, if possible. It should be noted that this program can only convert existing video and can't extract data from a DVD or other media.

PocketTV Classic. It's impossible to argue with the price of the PocketTV Classic (free; www.pockettv.com; Pocket PC) MPEG movie player for Pocket PCs. It plays movies that are encoded in MPEG-1 format that have .MPG or .MPEG file extensions and has a JPEG capture feature for snapping still images of movie files. It also supports several movie resolutions.

Pocket Tunes. Pocket Tunes (\$12.95 Basic, \$24.95 Deluxe; www.pockettunes.com; Palm OS) is a full-featured MP3 player and organizer for Palm OS devices that comes in two versions. The cheaper Basic edition plays MP3, Ogg Vorbis, or WAV files, lets users listen to



Turn your Palm OS device into a full-fledged MP3 player with PocketTunes, which supports advanced features such as gapless playback and a crossfader.

streaming MP3s when the Palm OS device is connected to the Internet, and comes with a graphic equalizer. The Deluxe version has all that plus a crossfader, bookmarks to resume playing where you left off, and gapless playback to remove pauses between tracks. Both versions are fully skinnable to modify their appearance. A **skin** replaces the graphics for a program's interface, making it look like polished metal or varnished hardwood, for example, and is downloadable via the Internet.

MP3 aficionados with Pocket PCs should download PocketMusic posthaste (free; www.pocketmind.com/pocketmusic.htm; Pocket PC), as the free player can handle MP3 audio files at any bit rate. It keeps things organized and is even compatible with the thousands of skins available for Winamp 2.x, so users can easily change the look and feel of the software without reducing its core features, such as a graphic equalizer and resizable playlist window.

VITO SoundExplorer. If you're looking for arguably the most full-featured music player and sound recorder available for the Pocket PC, VITO SoundExplorer (\$19.95; vitotech.nology.com/products/soundexplorer.html) fits the bill. It records and plays MP3 and WAV audio files to internal memory or memory cards and can convert the files back and forth between the two formats. Users can fine-tune the sound using a three-band parametric equalizer, and SoundExplorer's input and output levels are fully adjustable.

Games

Palm OS and Pocket PC PDAs are perfect for playing games on the go, and hundreds of titles are available for each platform. The following are among the best available and range from traditional card games to graphics-intensive role-playing games.

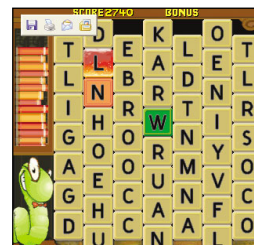
Snails. PC and console owners have Worms, and PDA owners have Snails (\$9.95; www.pdamill.com; Palm OS and Pocket PC), a knockoff that lets players lob artillery and other weapons at one another until one of the teams is wiped out. The game has a variety of weapons and destructible environments, but gravity, wind, and other effects make aiming more of an art than a science.

Lemonade Tycoon. Don't let the small-potatoes lemonade stand theme turn you off from what is a terrific cut-throat business simulation. Lemonade Tycoon (\$14.95 Palm/19.95 Pocket PC; www.hexacto.com) lets intrepid entrepreneurs turn a handful of seed money

into a multimillion-dollar company, but getting there means pleasing a variety of customers, tweaking your lemonade recipe, investing in the right equipment, and wisely managing your supplies and money.

Stuntman Evolution. Drive several vehicles through varied environments to solve puzzles in Stuntman Evolution (\$18.99; www.stuntmanevolution.com; Pocket PC), a great 2D game that plays like a 3D game. One of the game's highlights is the bulldozer, which you can use to transform the lay of the land to create ramps or remove obstructions so you can achieve the goals set out in each level. The game has three free add-on levels that you can get from the Stuntman Evolution Web site.

Bookworm. Bookworm (\$9.95; www.popcap.com; Palm OS and Pocket PC) is an uncommonly good word game from PopCap, the same company behind classic time wasters like Bejeweled. Link adjacent letters to create words, which then disappear to let new tiles fall into place. Just watch out for red tiles that burn their way through the other letters, because once they touch the bottom of the playing field, it's Game Over.



Good spelling knowledge helps in Bookworm, but the built-in spell checker doesn't hurt.

Legacy. Old school, turn-based role-playing hits both Palm OS and Pocket PC devices with Legacy (www.redshift.hu; \$19.99 plus \$9.99 for expansion pack; Palm OS and Pocket PC), which lets parties of heroes from seven classes slug it out with a variety of monsters from a first-person perspective. The graphics are excellent on both platforms, and the latest version comes with a number of improvements including health bars for the baddies, character renaming, and bows and arrows that add to the tactical possibilities in combat.

Pocket War. Pocket War (\$24.97; www.metalshard.com; Pocket PC) brings the gameplay of classic strategy games such as Empire to the Pocket PC platform, adding several touches that elevate it above its predecessors. The graphics are great, for one thing, and players are free to fuel their war machine with more than thirty types of units. Both PC and Pocket PC versions are available, so players can start their conquest on their desktop computer and continue the war on the go by transferring the saved game to a Pocket PC. Best of all, there are patches available that add new units, graphics, and other enhancements.



PocketWar brings the essence of turn-based wargaming to the small screen, and with much better graphics than the games that inspired it.

EverQuest. Why would users want to play an offline version of the massively popular online role-playing game EverQuest (\$19.99 per chapter; eq.pocket.station.sony.com; Pocket PC) on their Pocket PCs? Because it's a great game in its own right, letting players create characters chosen from four distinct classes and then building them up in various outdoor and dungeon environments by fighting hundreds of different monsters. The series is sold in a standalone chapter format, so if one of the settings sounds more appealing than the others, you don't necessarily have to start at the beginning.

GameBox Solitaire. GameBox Solitaire (\$9.95; www.pdamill.com; Palm OS and Pocket PC) may not have the sheer number of available games that some of its competitors have, but it sure is pretty. The cards have an antique look and are animated very well, and the game includes most of the popular solitaire variants such as Canfield, FreeCell, Klondike, and Pyramid Golf.

Odds & Ends

Music, video, and games represent the bulk of entertainment software available for PDA, but there are several excellent software and hardware products that don't quite fit into those categories.

Leonard Maltin Movie Guide 2004. Wouldn't it be nice if you could get some expert advice next time you're in the video rental store and can't remember whether a movie was panned or adored? Put the exhaustive Leonard Maltin Movie Guide 2004 (\$15.95; www.landware.com) on your Palm OS PDA and get instant access to capsule reviews of more than 19,000 movies along with lists of top movies and information about actors, actresses, and directors. The software can even help manage your own movie library and is online-enabled to keep you abreast of new releases and other movie-related news.

NoviiRemote. Use the integrated infrared transmitter in your Palm OS device to turn it into a universal learning remote control with NoviiRemote (\$24.99; www.novii.tv; Palm OS and Pocket PC). The software offers a completely customizable remote interface and can operate dozens of different devices depending on how much memory you wish to devote to its operation. Effectiveness depends on the strength of the PDA's infrared transmitter, so don't expect miracles, but the company also



NoviiRemote can do tricks that few dedicated universal remotes can match thanks to its flexibility.

sells a \$59.99 NoviiRemote Blaster which adds a more powerful IR transmitter that connects to a PDA via an SD Card (Secure Digital card) expansion slot.

CLiÉ Video Recorder. Can't bear to miss the latest episode of "Everybody Loves Raymond"? If you have a compatible Sony CLiÉ PDA, you won't have to, with help from the CLiÉ Video Recorder (\$299.99; www.sonystyle.com). The unit has an integrated TV tuner for recording cable or over-the-air feeds and records shows to Memory Sticks. It comes with software for scheduling recordings and supports several quality modes to extend recording times to a current maximum of 16 hours and 40 minutes if you use a high-capacity 1GB Memory Stick Pro card.

Veo Photo Traveler. An increasing number of Palm OS PDAs come with integrated digital cameras, but if yours didn't, be sure to check out the Veo Photo Traveler (\$79.99; www.veo.com). The small device plugs directly into the SD Card expansion slot of your Palm PDA and has a swivel lens to take 640 x 480 resolution pictures from nearly any angle. You can preview images on the PDA's screen before you snap a shot, and the Photo Traveler includes a thumbnail viewer to help keep things organized. All of this software is contained within the camera and installed as soon as you connect it to the Palm PDA. Veo also makes a version of Veo Photo Traveler for Pocket PCs.

Try Before You Buy. Both Palm OS and Pocket PC devices have changed so much throughout the years that users should download trial versions of software to test out on their PDAs before committing to a purchase. Sometimes PDA programs run too slowly to be of any use, and several others require so much memory that they may get in the way of your more important software. Of course, once you sample these programs and hardware devices, you might have to buy one PDA solely for entertainment purposes and another that handles boring business chores. ☺

BY TRACY BAKER

IT'S SHOWTIME



Talk about box office hits. Verbatim's new DigitalMovie™ DVD recordable media is so hot you can almost smell the popcorn. Available as DVD-R or DVD+R, this 4X speed DVD media looks – even feels – like a Hollywood movie reel. But don't think you need a director's chair to use them. These mini-reels are perfect for home movies, business presentations, transferring files – anytime you want to add a little fun to the show. And of course, DigitalMovie DVD has the same unsurpassed performance and reliability you've come to expect from Verbatim. So make your next show a feature presentation. DigitalMovie DVD from Verbatim. It's the reel thing. For more information, contact us at 800-421-4188 or online at www.verbatim.com.

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CE Lite

On The Lighter Side Of Technology

COMPILED BY MARTY SEMS

Swissmemory USB Victorinox

Yep, that's a Swiss-Army-style knife with a USB flash memory key on it. We'll spare you the derision over the unlikely scenario of being lost in the hinterlands and needing a trusty USB drive to survive. Nobody we know really carries a hip-bruising Swiss Army knife into the bush anyway (nothing but the finest cheap Leatherman knockoffs in our camps, tenderfoot). And who has actually used the corkscrew or ruler packed into one of the larger everything-but-the-kitchen-sink varieties? Ah, well, we digress. As a gift for the geek who is so hard to shop for, look for a Swissmemory USB Victorinox (www.swissbit.com) available this spring. These pocketknives don't go overboard with useless tools, and they're just \$69 for the 64MB version and \$84 for 128MB.



Stelladaptor 2600 Controller To USB Interface



There's been plenty of effort to keep old-school games and platforms alive through emulators. Adaptation of old hardware is trickier, though, so there has been relatively little movement on that front. Home-brew cartridge purveyor Pixels Past (www.pixelspast.com) stepped forward recently to fill a big gap. The Stelladaptor (\$29.95; www.atariage.com) lets you connect any Atari 2600-compatible joystick, paddle, or driving controller to your Linux, Mac, or Windows PC's USB port. Game emulator developers are adding support as we write this. Don't forget that Commodore 64s also used Atari-style controllers, so dust off that rock-solid SunCom TAC-2 stick and go plunder the Temple of Apshai once more.



Racing Guide Remote

The more dynamic the sports action on TV, the less you physically want to move. Hey, you might miss something. Don't lose your pole position in the fast-paced world of NASCAR. Use the Racing Guide Remote (\$49.95; racingone.guide.remote.com). This remote control pulls free NASCAR TV listings through your Internet connection and displays it right in your hand. It can even handle many DVD player, VCR, and DSS/satellite/cable box functions. You can shop for it at fanshop.racingone.com, where it's called the RacingOne Evolve Universal Remote.



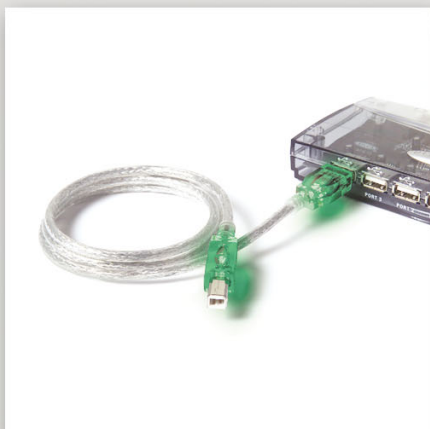
Mosquito Repeller Watch

Gadget Universe's site offers this evidence that the Web can inform as well as entertain: "If there is one thing a pregnant mosquito doesn't like, it's a male." You can put this hypothesis to the test for just 30 bucks with the Mosquito Repeller Watch (\$29.95; www.gadgetuniverse.com). With this classy timepiece, you can finally repulse females in a more targeted, useful way. Watch out, though. We found it incredibly easy to get hold of Gadget Universe people willing to take a phone order from us, but impossible to get anyone else to talk to us. One phone rep suggested we write the company a *snail mail* letter. Perhaps we sounded too much like a male mosquito.



Mobile Sensor Pen

OK, maybe a few well-timed cell phone rings could have made history much nicer. Napoleon Bonaparte might have faded away as a mere example of LGS (Little Guy Syndrome) had a few ringtones of "Frere Jacques" interrupted his war-planning sessions. On the whole, though, mobiles ringing during movies and funerals tend to make us grumpy, sometimes lethally so. To judge by the florid prose about this gem at www.iwantoneofthose.com, we're not alone in this sentiment. The Mobile Sensor Pen (\$17.41) is supposed to blink its light when you receive a call on your 800MHz to 1800MHz phone, so you can silence that ringtone that everyone hates but you.



Belkin USB Lighted Cables

We're acutely aware that glowing computer accessories like this are very easy to overdo, but we've also seen otherwise rational people swoon over "sexy" case lights. If you can promise to keep your system above a minimum floor of taste, we'll tell you about the latest USB cables from Belkin (\$29.99; www.belkin.com). These 6-foot, shielded, A-to-B lines glow on both ends with red, green, blue, or white LEDs. You can complement the cold-cathode light in your modded rig with these, or draw attention away from your sad, beige soldier. \$29.99 seems like a bit much to pay for a USB cable, but that includes Belkin's lifetime warranty.



Music & Movies

The Latest Tracks & Flicks:
Are You Not Entertained?

Eric Clapton

"Me And Mr. Johnson"

Reprise Records

www.repriserecords.com

Our take: Clapton does Robert Johnson extremely proud.

From the first run of fuzzy, blues-soaked notes Eric Clapton unwinds on "When You Got A Good Friend" from "Me And Mr. Johnson," you know you're in for something special. We know Clapton can tear off an inspired solo any time he wants, piling on layer after masterful layer of tension-and-release-shaped riffs that somehow blast off



toward a planet lesser players can only hope to visit but never really reside on. But what Clapton turns loose here is understated, mesmerizing stuff. This playing is done with a greater purpose: honoring the eternal gift Robert Johnson bestowed on Clapton (and us) in the way of a devastatingly brilliant collection of delta-tinged cuts recorded in the 1930s in Texas. Clapton covers 14 of those gems as only someone who's been deeply wounded, yet enlightened, by pain can do.

Johnson's work is universally considered holy ground. If you're not familiar with his actual songs, you're probably at least familiar with the legend that

surrounds Johnson, which purportedly had him selling his soul to the devil at the "Crossroads" outside of Clarksdale, Miss., in exchange for the ability to play a guitar with otherworldly skill. Johnson died at just 27 (supposedly having been poisoned by a jealous husband), but his influence resonated down into everything from Delta and Chicago blues (Willie Dixon, Muddy Waters, Sonny Boy Williamson) to the 1960s British blues movement (John Mayall's Blues Breakers [of which Clapton was a one-time member], The Yardbirds, Fleetwood Mac, Traffic) to Led Zeppelin (think "The Lemon Song"), and back to Texas (ZZ Top and Stevie Ray Vaughn).

Clapton has always acknowledged Johnson as his musical guiding light, and you sense on "Me And Mr. Johnson" just how humbled he is in the presence of Johnson's songs. The dead giveaway is Clapton's vocals, some of the most poignant he's ever recorded. Low-key and restrained, the mournful authenticity Clapton echoes stops you stone cold in your tracks. Take "Traveling Riverside Blues" and "Hell Bound On My Trail," for example. If Clapton doesn't have you shivering as he wails "She got a mortgage on my body now, Lord, and a lien on my soul," you've never been desperately in love. Clapton can't match Johnson's original desperation and decay (no one can), but he's swum through a muddy water or two—drug and alcohol addictions, his son's death, and well-documented failed loves—and he holds his own. Often sadly beautiful, Clapton's vocals reflect his weather-beaten wisdom. Check out "Me and The Devil Blues" if you doubt that he's collapsed on death's doorstep a time or two.

The players backing Clapton here are top tier and breathe fresh air into Johnson's tunes without taking away

their original wonder. The great Billy Preston's piano and organ jaunts are stunning, with his Boogie Woogie strolls on "They're Red Hot" standing out. Elsewhere, Jerry Portnoy's harmonica fills the gaps perfectly: not too much, not too little. And the fuzzed-out, dirt-road grooves and slide work of Texas great Doyle Bramhall II perfectly match Clapton's occasional bursts.

If you've spent any time with Robert Johnson's music, you know it's sacrilegious to even suggest anyone could do his songs better, but Clapton may have just pulled it off. "Me And Mr. Johnson" is Clapton's best work in many years, and it's a must-have for anyone with a taste for the real deal.

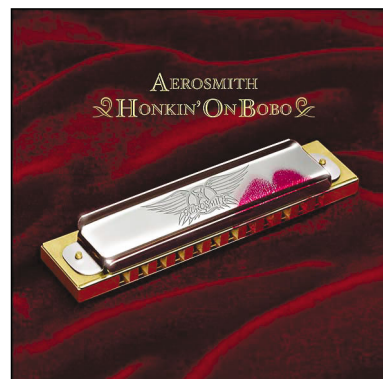
Aerosmith

"Honkin' On Bobo"

Columbia Records

www.columbiarecords.com

Our take: The boys from Boston throw a mighty blues party.



Like Clapton, Aerosmith dips deep into the blues covers bag for its latest, "Honkin' On Bobo," covering the likes of Willie Dixon ("I'm Ready"), Bo Diddley ("Road Runner"), and Sonny Boy Williamson ("Eyesight To The Blind"). Unlike Clapton, though, Steven Tyler, Joe Perry, and company aren't expressing a whole lot of misery here. These are fierce juke-joint, barnstorming blues that, as the album cover says, are "done Aerosmith style." Better still, this is the return-to-roots album that old-school Aerosmith fans have been waiting a long time for.

What Tyler lacks in pulling off down-and-out blues vocals, he makes up for



with his enthusiasm and trademark improvised scats and wordplay. On Big Joe Williams' "Baby, Please Don't Go," for example, Tyler weaves in and out of Perry's scorching jabs and hooks. Tyler and Perry are battling for dominance over the song, and it's impossible to say who wins.

Even full-blown Aerosmith junkies will acknowledge that Tyler's over-the-top approach can get overbearing at times, so it's a welcome relief when he relinquishes the mic to Perry (aka Hurdy Gurdy) and Tracy Bonham on "Back Back Train," the album's standout cut. Perry's Dobro work puts the

definitive stamp on this beauty. "Jesus Is On The Main Line"—the album's gospel-like, call-and-response closer—is a close second, with Tyler setting the scene and Perry's slide guitar providing the steamy, hot-Sunday-morning-in-church backdrop.

"Honkin' On Bobo" marks the return of Jack Douglas to production chores. Douglas manned the boards for Aerosmith's earliest albums, and his return is most welcome. The album's only real clunker is "The Grind," a Tyler and Perry original that's goods we've heard too many times before. More fun is Mississippi Fred McDowell's "You Gotta Move," where Joey Kramer's drumming is heart-thumping splendid and Brad Whitford interjects his always-steady rhythm guitar.

Aerosmith has been (unfairly) referred to as a second-rate Stones more than once. If only the Stones could still pull off an album's worth of something this down-and-dirty fun.

Kill Bill Volume I

Revenge Is A Dish Best Served Cold

Kill Bill Vol. 1" is a carnage-filled movie with just one focus: revenge. The film's over-the-top, stylized violence is Quentin Tarantino's homage to many B-rated film genres, but is heavily weighted toward honoring those classic Hong Kong-style kung-fu and spaghetti Western flicks.

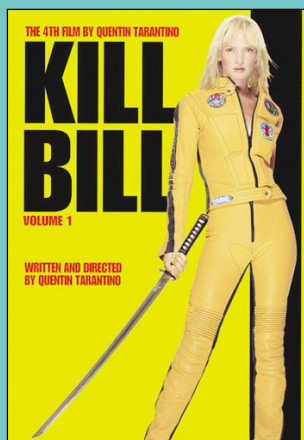
Let's get the paper-thin plot out of the way (noting that Vol. 1 is only the first of two parts): The Bride (Uma Thurman) and her entire wedding party are murdered by her former gang (the Deadly Viper Assassination Squad, led by Bill, her former love interest). She recovers from a four-year coma and plans to exact retribution for the loss of her unborn baby. The Bride has her sights set on Vernita Green (Vivica A. Fox), O-Ren Ishii (Lucy Liu), Elle Driver (Daryl Hannah), Budd (Michael Madsen), and Bill (David Carradine). That's it. Vol. 1 focuses on The Bride's encounters with the first two characters and ends with a cliffhanger that leaves you begging for Vol. 2.

This release, not surprisingly, quenches your thirst without satisfying your need, which is perhaps the point. The soft video quality disappointed us, but the grainy look seems almost intentional and meshes with the film's style. The film's color levels are fine, and the picture quality is very vivid. The DTS audio track is the most aggressive one on the disc and conveys the excellent soundtrack and special effects with ease. The DVD's extras are paltry. They include your basic making-of documentary (where nothing of any real importance is revealed), a couple of music videos, and

a Vol. 2 trailer. We can expect a sequel DVD release of similar caliber before Tarantino and Miramax pony up for the inevitable uber-special edition combining both films. That said, consider renting this DVD until both films are released in one package.

Some of you will be interested to learn that there's an uncut 113-minute release of this DVD from Japan (Region 2) with even more carnage. This version replaces the toned-down black and white footage in the U.S. theatrical version with color. It's the best version you can buy today. "Kill Bill Volume. 1" is rated R for profanity and violence. ■

BY SAMIT GUPTA CHOUDHURI



Disc Specs: 111 minutes; 2.35:1 Anamorphic Widescreen; English and French Dolby Digital 5.1, as well as English DTS 5.1 audio tracks; 22-minute "Making Of Kill Bill Vol. 1," two music videos; and Tarantino film trailer.
Studio: Buena Vista
MSRP: \$29.99

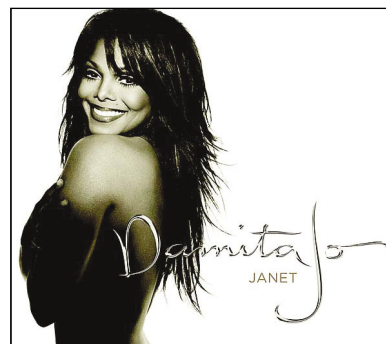
Janet Jackson

"Damita Jo"

Virgin Records

www.virginrecords.com

Our take: Ms. Jackson gets too nasty.



It used to be that Janet was the normal Jackson sibling. Not anymore.

Like you, we've formed our own opinion about the now-infamous "Super Bowl wardrobe malfunction." The thing is, even if Jackson is truthful about the gaffe not being calculated, she should have known no one would give her even the slightest benefit of the doubt after listening to "Damita Jo," which is so undeniably dominated by sexual references, you can't help but believe Jackson's Super Bowl derobing was a long time in the planning.



Shameless mass-audience cries for attention aside, Jackson needs a hit with "Damita Jo" (titled after her middle name/alter ego/etc.). Let's face it: Her career is defined more by how many records

she sells than by how good they are. Jackson's previous "All For You" and "The Velvet Rope" sold respectably, but Jackson has been steadily slipping down pop music's ladder at a worrisome rate. "Damita

Jo" may slow the slide a bit, but it doesn't look like it's going to get her any higher up. Most of the reason for this is "Damita Jo's" painful display of all things sexual.

From posing topless on the CD cover to lyrics that leave nothing to the imagination, Jackson has gone from innocent flirtation to literally letting it all hang out. The songs on "Damita Jo" are at times so explicit ("Warmth," "Strawberry Bounce," "Like You Don't Love Me"), you don't know whether you're blushing from the strong sexual content or from feeling embarrassed at Jackson's apparent desperation to shock an audience. We'd give you lyrical examples, but this is a family magazine. Heed the parental warning on the CD's cover. You don't want your grade-school daughters treading anywhere near this stuff. Ours won't be.

That's a shame because musically, Jackson has some nice things happening here. From the obvious Jay-Z-influenced "Strawberry Bounce" to the Dallas Austin produced "Just A Little While," Jackson offers up some playful melodies that deserve to be heard. The 1970's bass lines in "All Nite (Don't Stop)" and "R&B Junkie" are nice velvet funk, and the hook on "Like You Don't Love Me" swirls around your head long after the song is over. If Jackson could find some middle ground between the sappiness and need to beat us over the head with her supposed sexual freedom, "Damita Jo" might have made a few people look past the Super Bowl fiasco.

School of Rock (Special Collector's Edition)

Jack Black Gets His Groove On, Again

Commenting on the bland and uninspiring state of '70s music, punk icons the Ramones asked, "Do You Remember Rock and Roll Radio?" "School of Rock" sure does, celebrating everything that is, or was, rock, from ear-piercing guitar solos to its stick-it-to-the-man attitude. Jack Black stars as Dewey Finn, an unemployed but resolute rock guitarist who believes his life's purpose is to "service society by rocking." Financially strapped, Dewey pretends to be a substitute teacher at a \$15,000-a-year elementary school. After seeing his precocious group of 10-year-olds during music class, he hatches a plan to teach them to play rock instruments to win a \$20,000 Battle of the Bands contest. However, Dewey must accomplish this task without the knowledge of the school's principal (Joan Cusack) and the students' parents.

Directed by Richard Linklater ("Dazed and Confused"), "School of Rock" strikes all the right musical and comedy chords. The film's soundtrack is naturally grounded in classic rock (AC/DC, David Bowie, Led Zeppelin). Dewey requires students to listen to Pink Floyd, Rush, and Yes for homework, and teaches lessons on rock history, theory, and appreciation. The kids are all naturals; funny, sensitive, and bloody talented, playing their own instruments and even jamming live during the film's closing credits. Black is the biggest kid of them all, his usual frenetic self injecting Dewey with the infectious enthusiasm of a minister preaching the gospel of rock, the evils of MTV, and dismissing contemporary pop idols Christina Aguilera and Puff Daddy as legitimate musical influences.

The DVD contains two commentaries, one with Black and Linklater

together, the other with just the kids. Not surprisingly, the young stars don't offer many unique insights into the film's production. They're just having a blast watching themselves. Other special features include a hilarious appeal by Black to Led Zeppelin to use their "Immigrant Song" in the film, and the documentary "Lessons Learned in 'School of Rock'". Additionally, there are numerous interactive features. You can study Dewey's Chalkboard of Rock, test your knowledge of rock trivia, and watch an audio commentary where Black names his five, er, four favorite bands. Even if you don't remember rock and roll radio, "School of Rock" makes you wish you did. ■

BY DAVID WHITT



Disc Specs: 109 minutes; widescreen enhanced for 16:9 TVs; Dolby Digital, Digital 5.1; English and French Surround; commentary by Jack Black and Richard Linklater; Kids' Commentary; "School of Rock" music video; Kids' Video Diary Toronto Film Festival.
Studio: Paramount
MSRP: \$29.95

Bob Dylan

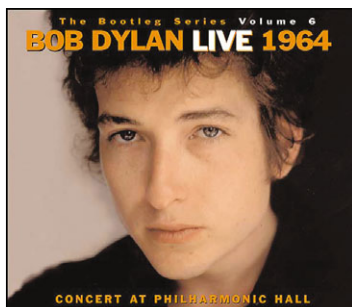
"Bob Dylan Live 1964 – Concert At Philharmonic Hall"

Columbia Records

www.columbiarecords.com

Our take: The master caught in his glorious youth.

Typically, live albums fail to offer a whole lot to anyone but the serious fan. There are exceptions, however. Take Bob Dylan concerts, for example, many of which have reached mythical proportions. Be it for what he said, how he said it, or just the fact he dared to say it, many Dylan shows have become the stuff of musical legend. Such is the case with "Live



1964," the sixth volume in Columbia Records' excellent Bootleg Series.

Recorded Halloween night 1964 in New York's posh Philharmonic Hall, "Live 1964" is Dylan youthfully fantastic. Just 23 at the time, Dylan exposed himself and his songs acoustically raw for devotees, detractors, and just the plain curious. The selection of songs Dylan presented at the

Philharmonic came as he was trying to live down the "voice of a generation" label, even as social (the civil rights movement) and political (a barely post-JFK America) upheaval raged on. The songs remarkably demonstrate a gift from a once-in-a-lifetime songwriter. The show also marks a stark contrast to the paranoid, rocked-out shows he would start performing, seemingly at a 100mph, just years later. In short, Dylan in 1964 would never be as loose and free from the constraints of fame again.

Accompanied only by his guitar and harmonica, the talkativeness and humor Dylan displays (rumored to be fueled by alcohol and other substances) provide a startling glimpse at a young Dylan before he became an icon. Included is the barbed "Talkin' John Birch Paranoid Blues," which

got Dylan banned from "The Ed Sullivan Show" when he refused to substitute another song in its place. He also introduces "If You Gotta Go, Go Now," "Gates Of Eden," and "It's All Right Ma, (I'm Only Bleeding)" for the first time. It's on this last cut that Dylan is at his best, hypnotizing the audience with an impossible intensity.

Is "Live 1964" only for Dylan loyalists? Not by any stretch of the imagination. The summations he makes on living in a post-JFK world ("Mr. Tambourine Man") that's engulfed in a civil rights movement ("With God On Our Side") and entrenched in issues of morality ("Who Killed Davey Moore") is prime stuff for anyone of any generation. **CE**

BY BLAINE A. FLAMIG

A Room With A View (Two-Disc Special Edition)

Oh, Those Lighthearted Edwardians

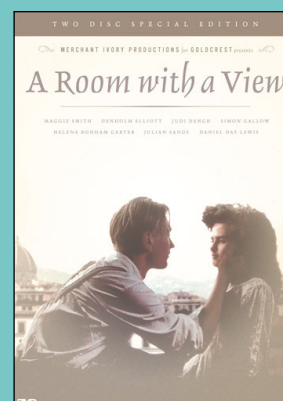
It's a good sign when a two-hour period comedy based in the stuffy Edwardian times speeds by faster than expected—on the fifth viewing, no less. Granted, we've seen this film several times since its 1986 release, but it's a pleasure watching a movie that consistently leaves you with a feel-good sense of being. Of course, being nominated for eight Academy Awards in 1986 (and winning three) says something about the quality of this picture. The film features an excellent cast that includes a young Helena Bonham Carter, Denholm Elliot, Julian Sands, Judi Dench, and a young Daniel Day-Lewis. The indie team responsible for this film has since created other period masterpieces, such as "The Remains Of The Day" and "Howard's End."

Image Entertainment released "A Room With A View" on DVD in 2000. The non-anamorphic video lifted off the previous laserdisc edition was not up to snuff for a movie of this caliber, especially when it didn't do justice to the film's Oscar-nominated cinematography. The director and cinematographer oversaw the remastering process from the original negatives for this release, and that is why the film looks so good on this

DVD. The remastered 5.1 audio is audibly better than the previous release and provides a rich, lustrous soundtrack with crystal-clear dialogue. Additionally, four members of the cast and crew provide an interesting audio commentary track for the movie. The second DVD has a wealth of extras, of which a documentary on author E.M. Forster (on whose book this movie is based) is quite educational. The other interview's bits and pieces are interesting (for example, footage of Daniel Day-Lewis on a British breakfast chat show in 1986) but ultimately insubstantial.

Movies have a hard time making the transition from classic books, but "A Room With A View" succeeds in a way that most do not. It's a friendly, heartwarming, and romantic period comedy that made it big at the box office before a glut of similar films arrived over the following years. The movie is unrated, and with the exception of the comedic pond scene midway through, falls in the PG range. ■

BY SAMIT GUPTA CHOUDHURI



Disc Specs: 117 minutes; 1.85:1 Anamorphic Widescreen; English Dolby Digital 5.1 (remastered), French and Spanish Dolby Digital 2.0; audio commentary by Ismail Merchant (producer), James Ivory (director), Simon Callow (actor playing Mr. Beebe), and Tony Pierce-Roberts (cinematographer); Disc 2 features "E.M. Forster Remembered" documentary along with featurettes on Merchant/Ivory, brief interviews with Simon Callow (1985) and Daniel-Day Lewis (1986), rare photo gallery.
Studio: BBC/Warner
MSRP: \$26.99

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Game On

This Month's Scary Games Hit A Home Run

Winning Eleven 7 (PS2)

EA's FIFA series has all the official licenses and dominates the sales charts, but soccer fans the world over know that Konami's Winning Eleven series is the superior simulation of the sport. The latest entry in the series, Winning Eleven 7, improves both the graphics and gameplay of its excellent predecessor to emerge as the best soccer game ever released, period.

Winning Eleven 7's major strength is that it gives players control over every aspect of the game. From the voluminous setup options to the myriad moves players can pull off on the pitch, this is a game that caters to the aficionado's every desire. It takes a lot of practice to learn the controls, as so many moves are available, and the button combos are

somewhat like those found in a fighting game. But once learned, they give players fine control over their dribbling, passing, shooting, and other skills that are unmatched by any other soccer game.

Konami scrapped the graphics engine from Winning Eleven 6 in favor of an engine that allows for much more fluid and varied animations. Players can watch replays of the action so they can savor the graphical detail up close, and the camera can be repositioned in several ways to get the best perspective during gameplay. The game has exhibition and practice modes for some quick action, and the various Cup modes are knockoffs of the World Cup that create a number of round-robin tournaments. Diehards can participate in League mode, which lets them play a full



Keep your head in the game.

or half season, participate in nearly all aspects of team management, and track detailed stats. Master League mode steps it up a notch by putting players in charge of recruitment, and it is possible to create custom players and teams to use in this mode. Winning Eleven 7 may not have all the official logos used to legitimize competing products, but it proves you don't need all that chrome to deliver outstanding gameplay. ■

BY TRACY BAKER

Winning Eleven 7

\$39.99

Konami

www.konami.com/usa

ESRB: Everyone

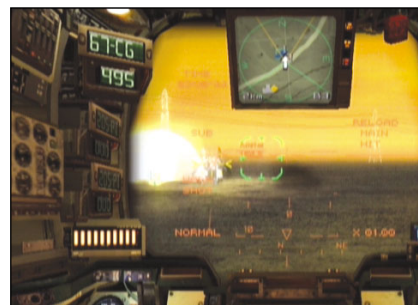
Steel Battalion: Line of Contact (Xbox)

The original Steel Battalion stunned Xbox owners when it was unleashed in 2002. It wasn't just the game's mechanized multistory-high VTs (Vertical Tanks), gritty graphics, incredible attention to detail, and massive \$199 price that drew all the attention. Instead, the game's 3-foot-wide proprietary controller stole the show. Equipped with two control sticks, a gear lever, dozens of buttons, and three foot pedals, the Steel Battalion controller offered an unprecedented amount of immersion and control and quickly sold out in the States.

Now Steel Battalion is back, the controller is back, and Steel Battalion: Line of Contact is here to offer multiplayer mayhem that was missing from the original game. In fact, Line of Contact is an online-only game, so prepare to spend plenty of time with the single-player original before hopping online to work

with and against opponents from all over the world. The graphics have improved immensely, and the game looks stunning in widescreen 720p HDTV mode. The game's sound is also excellent, with Dolby Digital 5.1 support that is indispensable for situational awareness because the player's view is so restricted.

In the game, the left stick turns the VT left and right and aims the player's view, while the right stick controls aiming and firing. Meanwhile, players must shift into the proper gear, accelerate, and brake using the foot pedals and manage subsystems such as the minimap display. This juggling act is difficult in itself, let alone when massive bullets and rockets are pounding at you, and it doesn't help that most online matches have lag issues. Still, if you can afford the original, the sequel, and the Xbox Live account required to play online, Steel Battalion: Line of



It takes a lot of skill to control the monstrous VT, but the HUD helps.

Contact is a unique experience that is more than worth the entry fee. ■

BY TRACY BAKER

Steel Battalion: Line of Contact

\$49.95 (Steel Battalion with controller and Xbox Live account required to play)

Capcom

www.capcom.com

ESRB: Teen



Tom Clancy's Splinter Cell Pandora Tomorrow (GBA, Xbox)



The lighting effect graphics looked good in the original Splinter Cell but are even more stunning in Pandora Tomorrow.

The second Splinter Cell game, Pandora Tomorrow, brings back super spy Sam Fisher in this stealth gaming masterpiece. This time he's trying to save the world from a bioweapon in the hands of a renegade guerilla, but we'll leave you to work your way through the plot. You can expect to play through the eight single-player missions in less than 15 hours at the Normal difficulty level.

Some solid improvements have been made to graphics and gameplay over the 2002 original. It doesn't seem possible, but the in-game graphics are noticeably better, and the game now features more interesting mission environments. Skirting a sentry and his flashlight by crawling through swampy water (with attractive vegetation) makes gameplay more immersive. The game's animations, such as seeing a train blur by with newspapers flying, are breathtaking. Fisher also has some new moves. He can pivot past a doorway to another wall, thereby evading detection, and he can do his trusty splits with a variation that permits him to scale walls. Pandora Tomorrow's enemy AI also seems to have improved slightly. This time around, the enemies will don flak vests and helmets if you raise their alert level.

Make sure you play with the audio turned up. The 7.1 speaker support is fantastic, but gamers with 5.1 configurations will also enjoy the audio.

The biggest improvement in Pandora Tomorrow is the new multiplayer mode (it was released with a crash bug but is now patched and working as advertised), where you will play in Spy vs. Mercenary mode. The spies play very much like the single-player, third-person perspective stealth game, and the mercs play in first person. Whispering some smack into the ear of a mercenary before sending him to La La Land is satisfaction in itself.

You will adore Pandora Tomorrow if you even remotely enjoyed the original Splinter Cell. However, you will not be satiated if you felt that the original's gameplay should have offered some opportunities to run and gun. ■

BY SAMIT GUPTA CHOUDHURI

Tom Clancy's Splinter Cell Pandora Tomorrow

\$49.99

Ubisoft Entertainment

www.splintercell.com

ESRB: Teen

The Suffering (NGC, PS2, Xbox)



These ugly gits are just waiting to slash you open.

Capcom's Resident Evil wrote the book on the survival-horror genre. It's the game by which scary games are judged, so we're pleased to report that The Suffering makes a good foray into the action-oriented horror experience.

You play as prison inmate Torque, a man who has allegedly committed some

horrible crimes and is scheduled for termination. Shortly after his arrival at the prison, the power cuts out, and all kinds of profanity, screams, and blood break loose as Torque makes his way out of the cellblock to fight for his survival. Do not have your kids around when you play The Suffering. The game has ample amounts of profanity and blood. The initial shock value may be high, as this is the most profanity we've heard in any video game to date. The game's poor

voice acting may also shock you, and the quantity of low-quality textures won't win any graphics awards. Fortunately, the ambient audio effects are spot-on.

Play the game in a dark room and you *will* feel the creep factor in a big way. This is what provides the game with its redeeming qualities. Beyond the inmates and prison guards you meet

along the way, you will have plenty of frightening ordeals as you venture across hell spawn in the bowels of the prison. The game's atmosphere is absolutely horrible (in a good way for a survival-horror game), and the scenes you come across never dull the sense of macabre. The creatures you encounter are innovative and scary but do not provide enough variety. The game's momentum falters when you begin to get that "been there, done that" feeling later in the game. Still, the creep factor is high all the way to the conclusion, and your behavior/morality during the game will affect the outcome (there's more than one ending), which adds depth to the gameplay. ■

BY SAMIT GUPTA CHOUDHURI

The Suffering

\$49.99

Midway Home Entertainment

www.thesuffering.midway.com

ESRB: Mature



Ghost Recon: Jungle Storm (PS2)



Snipe your way to freedom in this so-so expansion pack for one of the best sneaker-shooters ever released.

Finally. That's what diehard Ghost Recon fans might think when they realize that Ghost Recon: Jungle Storm includes a whopping 31 multiplayer maps (PS2 Network Adapter required; broadband play only), the entire Island Thunder expansion (available previously on Xbox and PC), plus a whole new eight-level campaign mode. Another reaction: outdated. The Ghost Recon series started out as a PC game in

2001, and four years later the game still uses the same graphics, choppy sound bites, and nearly identical gameplay.

Of course, none of that matters if you enjoy sneaker-shooters. You'll have to sneak up on gun-wielding terrorists and take them out one by one to complete a mission. Jungle Storm adds a couple of new tricks, such as a Stealth meter that looks like an eye. Crouch down, and the eye will fade almost entirely; stand, and you'll be an easy target.

The game's story involves a surly drug kingpin, Cuban militants, and lots of island foliage. Ghost Recon encourages sniping from remote hillsides as opposed to run-and-gun warfare. There are no vehicles to drive, and weapons selection is somewhat limited. Ghost Recon lets you switch among teammates (using L1 and the left analog stick). If you die, you'll continue on with the next team member.

Jungle Storm neither raises the bar nor lowers the difficulty level from previous games. Flat textures that look

more like cartoon cutouts than real locations give Jungle Storm a dated feel.

Worse, the multiplayer mode on Ubisoft's own online server is limited to six players at one time, compared to 16 for Xbox Live and PC. Although there are several multiplayer modes to choose from, the PS2 broadband connection is shaky at best and caused a lot of frame drops and latency issues.

Despite these problems, Jungle Storm is still worth considering, mostly because the Ghost Recon gameplay is so engaging. Organizing an ambush, gang rushing a hidden bunker, and sniping a terrorist from 200 feet all feel like heroic accomplishments. For PS2 owners, it's about as close as you can get to squad-based antiterrorism. ■

BY JOHN BRANDON

Ghost Recon: Jungle Storm

\$49.99

Ubisoft

www.ghostrecon.com

ESRB: Teen

MVP Baseball 2004 (NGC, PS2, Xbox)

Let's cut right to the facts. MVP Baseball 2004 is one of the best baseball simulators ever, a game that looks and plays more like the real sport than any game EA Sports has ever released. The pitching and hitting are just perfect, and almost every inning features some entertaining and downright goofy thrills and spills. You'll see broken bats, hotheaded tirades in the dugout, missed throws, and Superman-like catches. MVP Baseball is more fun than ESPN Baseball and more accurate than All-Star Baseball.

It all starts in the batter's box. EA's Triple Play was graphically thrilling (if a little cartoony), but the hitting game was all luck and no skill. In MVP Baseball, you use the right analog stick to position your swing, and several on-screen indicators help you determine when and where to make contact with the ball. Color swatches show the pitching hot zones, so you can look for pitches to hit in the hot areas and avoid the cold areas. Most

importantly, you can easily spot sliders, split-finger fastballs, and changeups. At higher difficulty levels, you'll need to rely more and more on these visual cues.

Pitching in the game is just as lifelike. You can use the right analog stick to position the throw and then select your pitch using the controller buttons. A meter shows you how to release the pitch for the greatest accuracy. MVP Baseball lets you get into a rhythm and outsmart the batter with wild pitches, corner-of-the-strike-zone fastballs, and pitch-outs.

MVP Baseball 2004 simulates a lot more than hitting and pitching. As an inning progresses, you'll have control over the base runners and defense, sending your runners on a collision course with the second basemen to prevent a double-play, diving over walls, and using the cut-off man to prevent fly-ball tag-ups.

All in all, EA Sports deserves credit for going back to the drawing board after



Both hitting and pitching in MVP Baseball 2004 are a cut above the rest.

Triple Play Baseball became a critic's punching bag. MVP Baseball delivers a realistic and entertaining video game diversion for Randy Johnson and Derek Jeter wanna-bes. ■

BY JOHN BRANDON

MVP Baseball 2004

\$49.95

EA Sports

www.ea.com

ESRB: Everyone



Resident Evil Outbreak (PS2)

First, the easy stuff: Resident Evil Outbreak looks and sounds as good as you'd expect, with rendered-on-the-fly environments that boast a wealth of detail, crisp character models that move naturally, and the series' trademark sound effects and music. In fact, at a glance, it's easy to mistake Outbreak for any other current-generation RE game—until you pick up the controller, that is.

Outbreak offers players a choice of control schemes, including the traditional D-pad controls and a new analog control method that lets you simply push the stick in the direction you want to move.

But the biggest change is the new format, which provides a very different experience from past RE games, whether you play alone or online with up to three pals. For one thing, there is no pausing the game to switch weapons, reload, or stop to heal your wounds; zombies in the area keep coming and can even follow you

through doors into new rooms. This means you have less time to futz around searching each room and creates a greater sense of urgency. The game's characters are another big change. Instead of striding confidently through the city in the guise of a battle-hardened S.T.A.R.S. cop, you'll choose one of several average Joes that each have their own skills and weaknesses.

Online play is fun but can be difficult, as the game doesn't include keyboard or voice chat support, instead providing only a rudimentary collection of canned lines you can use to communicate with fellow players. So if you're unfamiliar with the game's scenarios, you'll likely be dead weight—or undead weight, as succumbing to the virus in online play zombies your character and lets you attack other players.

The upshot is that Outbreak is a fresh take on a formula that's nearly a decade old, which is both good and bad. The game's format unfortunately precludes



Kevin's survival tip No. 1: Always keep undead persons at least one leg length away.

the kind of involved storyline found in previous incarnations, but the increased intensity and the new multiplayer aspect make Outbreak a pretty good time. ■

BY CHRIS TRUMBLE

Resident Evil Outbreak

\$49.95

Capcom

www.capcom.com/outbreak

ESRB: Mature

PS2 HDD/Final Fantasy XI (PS2)



Sony's 40GB HDD comes bundled with Square Enix's Final Fantasy XI online RPG.

Historically speaking, video game console add-ons haven't done too well, but Sony began changing gamers' attitudes about console peripherals in late 2002 with the release of its Network Adaptor, and the internal HDD will likely continue that process.

The HDD fits snugly inside the case of the console, so it doesn't clutter your entertainment center or make the PS2 bulkier or more unwieldy. It's also easy to install and extremely easy to use, and its

potential for expanding your PS2's usefulness is obvious. Not only can you copy files from your memory cards onto the 40GB drive, freeing up card space and (in the long run) saving you money, you can also use it to install game data from HDD-compatible games, which can dramatically shorten load times or (in the case of the included Final Fantasy XI) save you the hassle of having to even load game discs. Resident Evil Outbreak, for example, lets you install a big batch of files onto the HDD, and we recommend doing so, as it cut load times considerably in our tests. In addition, the HDD will let PS2 owners who play games online download new content for their online-enabled games.

We're guessing Sony has other plans for the HDD, as well, but in the meantime another fairly compelling reason to get the HDD is that it comes with Square Enix's excellent Final Fantasy XI preinstalled. We previewed the game based on our experiences with the PC version in the April issue, and we're happy to say that the PS2 version outpaced our expectations.

We like the PS2 version's controls better than the PC's, and we're pretty sure most console gamers will agree. The only drawback is that chatting without a USB-enabled keyboard is a real chore, but a good keyboard only costs a few bucks. The game's graphics, while not on par with a good gaming PC with a high-end video card, are quite good given the PS2's disadvantage in video memory, etc. And because the PS2 version is compatible with the PC version, you can jump into a world that is already populated with a variety of players at various skill levels.

Long story short, the HDD and Final Fantasy XI bundle is a worthwhile investment for PS2 owners looking to expand the usefulness and extend the lives of their systems. ■

BY CHRIS TRUMBLE

PS2 HDD/Final Fantasy XI

\$99

Sony Computer

Entertainment America

www.us.playstation.com

ESRB: Teen (Final Fantasy XI)

The number of consumer electronic devices is proliferating and the complexity of using these devices in an interconnected world is increasing everyday. Most of these devices are not simply standalone items; they are meant to be connected to other devices, computers and networks.

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Retroscope

The Evolution, & Revolution, Of The VCR

The ability to record a TV show when it is broadcast and watch it whenever you desire, often called **time-shifting**, is now among the most mundane of tasks. Ditto buying or renting a copy of a new hit movie to view at home.

In the modern lexicon, “TiVo” is a verb, coined by fans of the DVR (digital video recorder), which was pioneered in part by the company of the same name. Similarly, the phrase “Blockbuster night,” coined by the video software retailer, is widely understood to mean staying home to watch a movie picked up at the store.

But time-shifting would not be possible, and neither TiVo nor Blockbuster would exist, if it were not for technological and legal precedents set by a much earlier product: the videocassette recorder, or VCR.

Not long after Sony introduced one of the earliest VCRs, in 1976, two Hollywood studios filed a lawsuit against the company, contending that the device was illegal because its ability to record TV programs enabled consumers to illegally copy the studios’ copyrighted property. After wending its way through a variety of lower courts, the lawsuit reached the U.S. Supreme Court in 1983. The following year, the Supreme Court ruled in favor of the VCR, declaring it legal and ruling that home video recording of broadcasts did not infringe upon the studios’ copyrights; such recording fell under the “fair use” exception in copyright law, the Supreme Court decided. A steep rise in sales of VCRs, which has only recently abated, followed the decision. Yet it was a rise that was a long time coming.

The earliest work on technologies leading to the VCR began in the early

1950s, when engineers at three laboratories (RCA, Ampex, and Bing Crosby’s Labs) were simultaneously developing the ability to record video to magnetic tape. According to a history of the VCR produced by the CEA (Consumer Electronics Association), “In April 1956, a six-man development team at Ampex, headed by Charles Ginsburg and including a young college student named Ray Dolby, shocked the National Association of Broadcasters (NAB) convention in Chicago with the first black-and-white videotape recording.” Ampex introduced the model VR-1000 VTR (videotape recorder), priced at \$50,000, for use by black-and-white-TV broadcasters. It used 2-inch-wide videotape. KING-TV in Seattle was the first customer for the VR-1000, which received a unit with serial number 1, the CEA says.

Next, the CEA says, “RCA traded its color technology for Ampex’s recording technology to produce the first color videotape recorder a few years later.”

RCA and Sony introduced more VTRs in the early 1960s. Among those were the RCA model TR-22, which was the world’s first all-transistor VTR when it was introduced in 1962, and the Sony model PV-100, which was the world’s first compact transistor VTR when it was introduced in 1963, according to the CEA and Sony.

It was not long before the VTR migrated to the home. In 1965, Sony introduced the model CV-2000, which used open-reel and 0.5-inch-wide videotape and had a maximum recording time of one hour. The device was very large, measuring 10.75 inches high x 17 inches wide x 15.5 inches deep, and only a few hundred were sold, according to the CEA.

“The idea of a videocassette first was proposed by Koichi Tsunoda, a Sony engineer, in 1964, after seeing Philips’ audio

cassette,” the CEA recounts. “But the question was whether consumers were interested in recording TV programs.”

Despite the uncertainty, development work toward a consumer-oriented VCR continued, and in 1972 Philips was the first to introduce such a device. The Philips model 1500, introduced in England, was the first VCR for home use, the CEA says. It measured 6.5 x 22 x 15 inches.

Three years later, Sony introduced the first Betamax VCR, which is widely regarded as the first commercially successful VCR. The model SL-6300 used 1/2-inch-wide videotape, could record one hour per tape, and cost \$1,300. (The SL-6300 was the first stand-alone Betamax VCR from Sony. Some months earlier, the company had introduced a unit built into a color-TV console that cost more than \$2,000, which was commercially unsuccessful.)



Sony’s SL-6300 VCR, the first Betamax machine, retailed for \$1,300 in 1975.

Concerned that the VCR was a tool for copyright violation, MCA/Universal and Disney sued Sony in 1976, in the U.S. Federal District Court in Los Angeles. Sony won the case in 1979, but the studios appealed to the U.S. Court of Appeals (Ninth Circuit), which in 1981 reversed the lower court’s decision, recalls Gary Shapiro, the president and CEO of the CEA. (At the time, Shapiro was an attorney with the law firm of Squire, Sanders & Dempsey, working on behalf of the consumer electronics industry.) The case then went to the Supreme Court,



which put its stamp of approval on the VCR. "If that decision had gone the other way," Shapiro asserts, "the whole course of consumer technology would have been thwarted."

Meanwhile, also in 1976, JVC (Victor Company of Japan) launched a competing VCR that used a 1/2-inch videotape, housed in a larger cassette than the Betamax tape, and based on a fundamentally different recording process. The VHS (Video Home System) was introduced in Japan with the model HR-3300, which could record two hours per tape. Starting in 1977, JVC, RCA, and a large number of other brands marketed the VHS technology in the United States. RCA developed a VHS tape with a four-hour capacity and launched a VCR model named SelectaVision that was priced below \$1,000.

Sales of VCRs skyrocketed. According to the CEA, which began tracking VCR sales in 1974, there were 250,000 VCRs sold in the United States in 1977, up from only 70,000 in 1976. By 1979, annual VCR sales nearly doubled to 475,000 units. The

million-unit mark was broken in 1981, when nearly 1.4 million VCRs were sold. In 1984, 7.6 million VCRs were sold and the devices were in 10% of U.S. households. After the Supreme Court decision, in 1985, annual sales of VCRs jumped to 11.3 million units, and household penetration jumped to 18%. One year later, in 1986, nearly one-third of U.S. homes had a VCR. More than half of households had a VCR by 1988, and by 2000 VCRs were in 95% of homes nationwide, and more than 23 million units were sold.

"In six months, the VCR format war was practically over," the CEA says. "Sales of VHS machines caught and passed Beta as the video-recording format of choice. By the summer of 1979, VHS was outselling Beta by a margin of two to one." There were two reasons, Shapiro says: the larger capacity of VHS tapes, and widespread licensing of the VHS technology by JVC to other manufacturers. Sony did not widely license the Beta technology.

Ultimately, Sony stopped selling Beta VCRs and started selling VHS units,

which it continues to sell today. Nevertheless, the format wars continued for a while. In 1985, Sony unveiled Super Beta, and in 1987 S-VHS (Super-VHS) was introduced by JVC.

In 1997, JVC launched D-VHS (Digital VHS), a version of the format that let satellite-TV users record shows to videotape digitally, rather than in an analog form like other VCRs. (Satellite-TV broadcasts programs in a digital format, using MPEG-2 encoding and decoding.) The first D-VHS VCR from JVC, the HM-DSR100, was introduced in two forms: a standalone model and a combination VCR/satellite/TV receiver marketed in conjunction with the satellite-TV provider DISH Network. In 1999, JVC improved on D-VHS, when it introduced the model HM-DR10000, which was the world's first D-VHS VCR capable of recording 24 hours per videocassette, according to JVC. JVC combined the digital-video recorder and the S-VHS VCR in 2000, in the model HM-HDS1. In 2001, JVC introduced the HM-DH30000U, which recorded HDTV broadcasts.

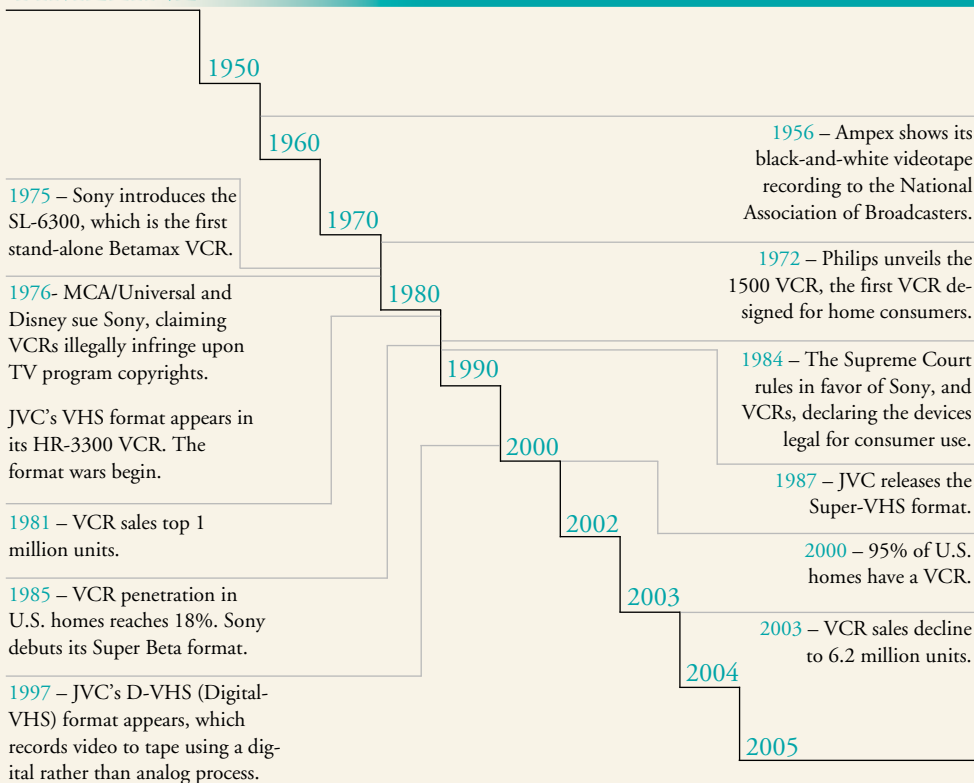
Since 2000, VCR sales have steadily declined each year, to 6.2 million units last year, and household penetration has fallen, too. By the end of 2002, the share of homes with VCRs fell to 92%, says the CEA. By 2007, the CEA expects annual sales of VCRs to fall to only 2.1 million units—a figure not seen since 1982.

However, the figures don't include VCRs built in to DVD-VCR or TV-VCR combination devices, which today are sold by myriad manufacturers at prices well below \$200.

"The VCR has not been abandoned," declares Sean Wargo, director of industry analysis at the CEA. "While there are signs that VHS is fading away, it's still being used, still being purchased." 

BY ROBERT E. CALEM

TIMELINE





CE Pick Of The Month

Beyond TV Is Right

We love DVRs (digital video recorders) here at *CE Tips* because they give TV viewers the kind of control that we've come to expect from the rest of our media sources (the Internet, digital music and movies, etc.). Rather than arranging your life to fit the whimsy of network programming execs, you can watch what you want, when you want, without having to worry about missing your favorite shows, and that's the way it should be.

But sometimes it's easy to forget that DVRs are much more than high-tech-looking set-top boxes with big hard drives and/or DVD recorders. When you get right down to it, none of that hardware would be much good without help from some pretty cool software to tell it

when to record and for how long, and that's where this month's CE Pick Of The Month comes in.

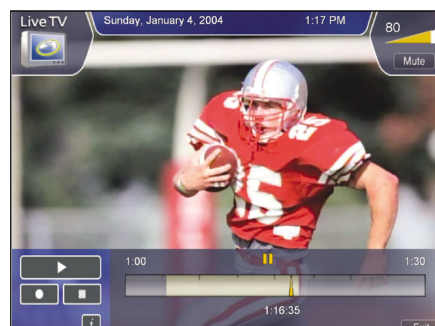
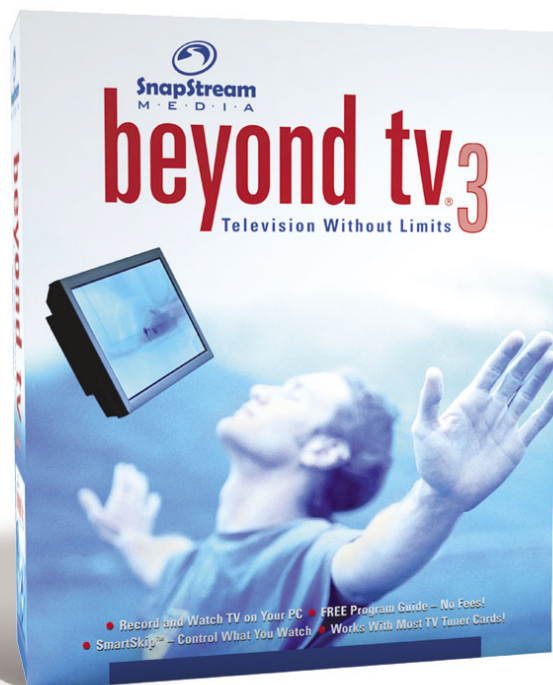
SnapStream Media is a software company that specializes in products for managing digital media, and its Beyond TV 3 software turns properly equipped PCs into TV-recording, commercial-skipping media powerhouses. The program's system requirements are mostly modest by current standards (WinXP/2000, 128MB of RAM, 10GB of hard drive space, most current CPUs); the only necessary item that is somewhat out of the ordinary is a TV tuner card, but even this requirement is simple to meet these days. Even if you have to buy and install a TV tuner card to run the software (or if you buy Beyond TV bundled with

Hauppauge's WinTV-PVR 250 for \$199.99), you'll still end up spending less than you would with most TiVo Series2 DVRs, for example.

And here's the real kicker: In addition to its modest price tag, Beyond TV 3 comes with free programming guide data, which means that you don't have to pony up for a monthly subscription to get the info you need to record your favorite shows. Just buy Beyond TV 3 and a TV card, if necessary, and you're ready to rock and roll.

We got our first taste of Beyond TV 3 at this year's Consumer Electronics Show and came away very impressed, and as you can see from our review of the product on page 35, our own in-house tests ended in the same result. It will be interesting to see how network lawyers react to the program's commercial-skipping feature (you may remember that ReplayTV had some difficulty in this area), but we have to admit that we love it, and all the software's features are as easy to use as they are handy.

This is the first time we've chosen a software product as our Pick Of The Month, but Beyond TV 3 is a great place to start. If you give it a spin, we think you'll see why. **CE**



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